Geographic Information Network of Alaska

www.gina.alaska.edu

Alaska Statewide Digital Mapping Initiative (SDMI)

Ortho and DEM project status

JACIE

April 18th, 2012

www.gina.alaska.edu | www.alaskamapped.org

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907-474-6182

first a detour

quick GINA overview

I've only got 100 slides to get through

Geographic Information Network of Alaska

www.gina.alaska.edu

UNIVERSITY OF
ALASKA
FAIRBANKS

12 staff

Jess, Scott, Will, Jason, Jiang, Sarah

Cheryl, Tom, Pete, Greg, Jay

Dayne

~2 million / year

80% soft money

Direct reception

Suomi NPP, Terra,

Aqua, *AVHRR*

Strong NOAA partnership

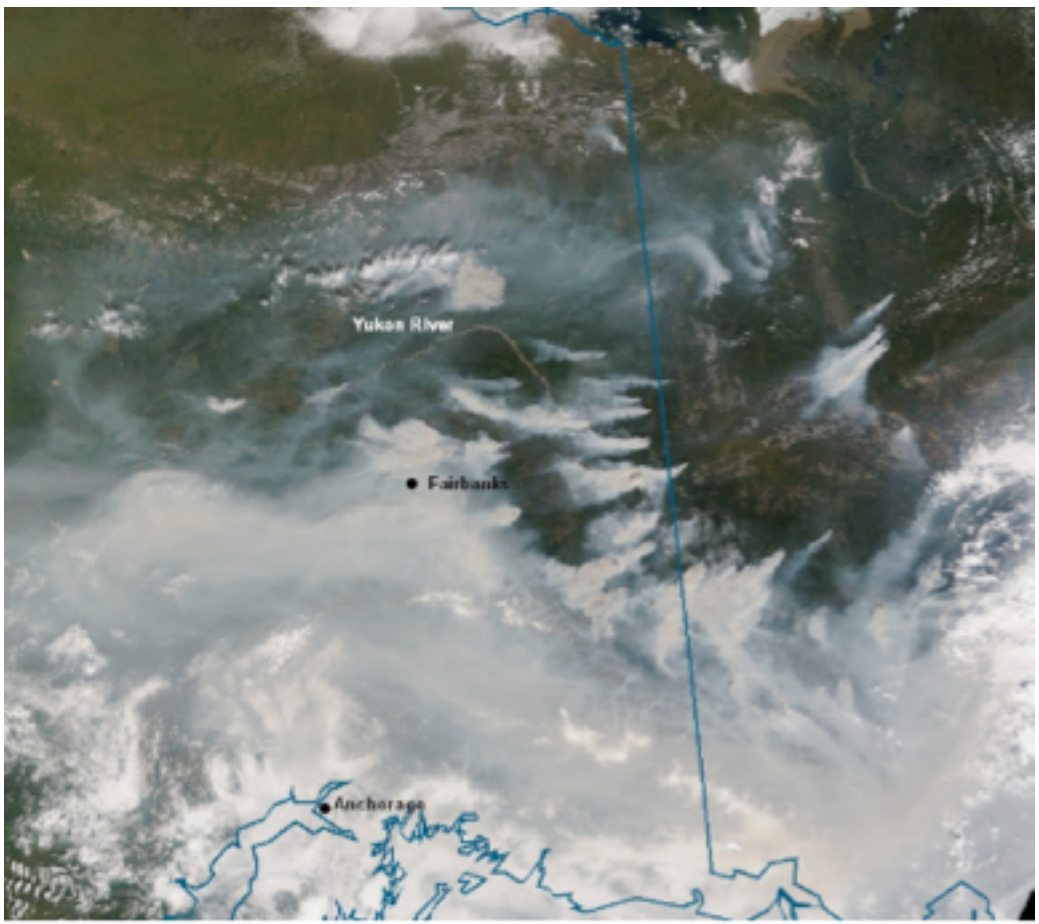
GOES-R proving ground member

Mitch (JPSS) funded our upgrade for NPP

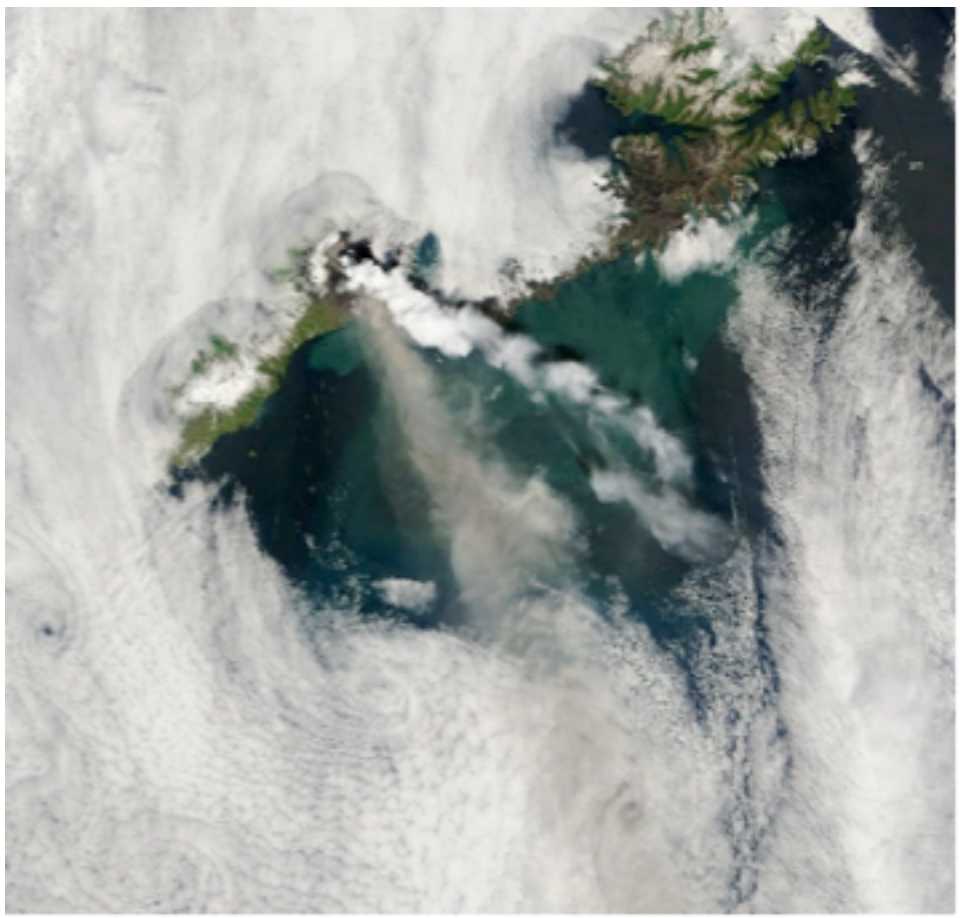
work closely with NOAA FCDAS

feed lots of data to Alaska Weather Service

Real-time, Operational Products



Fires - smoke



Volcanos - Ash

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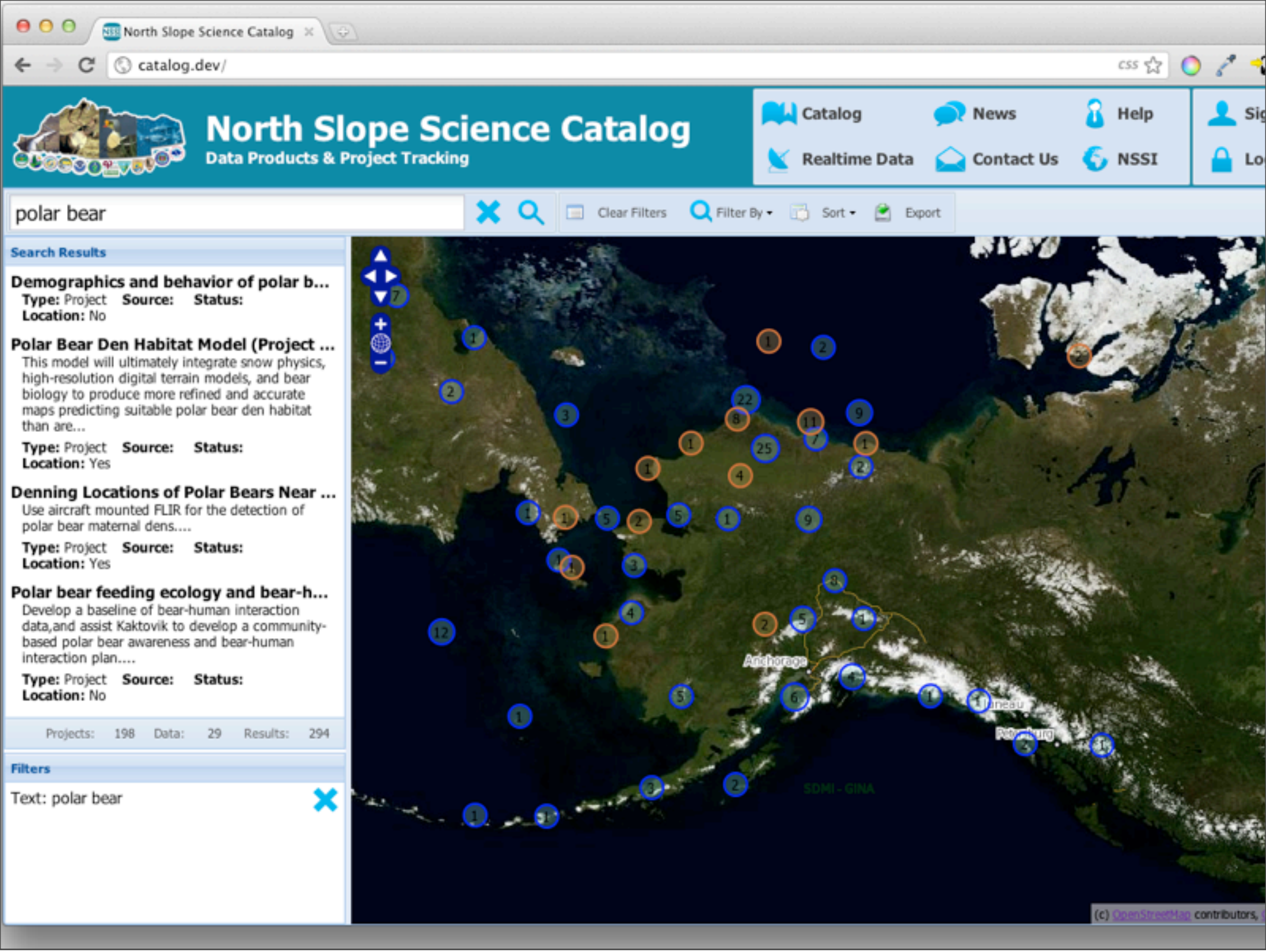

North Slope Science Catalog
catalog.dev/
North Slope Science Catalog
Data Products & Project Tracking
Catalog
News
Help
Realtime Data
Contact Us
NSSI
polar bear
Clear Filters
Filter By
Sort
Export
Search Results
Demographics and behavior of polar b...
Type: Project Source: Status:
Location: No
Polar Bear Den Habitat Model (Project ...
This model will ultimately integrate snow physics, high-resolution digital terrain models, and bear biology to produce more refined and accurate maps predicting suitable polar bear den habitat than are...
Type: Project Source: Status:
Location: Yes
Denning Locations of Polar Bears Near ...
Use aircraft mounted FLIR for the detection of polar bear maternal dens....
Type: Project Source: Status:
Location: Yes
Polar bear feeding ecology and bear-h...
Develop a baseline of bear-human interaction data,and assist Kaktovik to develop a community-based polar bear awareness and bear-human interaction plan....
Type: Project Source: Status:
Location: No
Projects: 198 Data: 29 Results: 294
Filters
Text: polar bear
Anchorage
SDMI - GINA
(c) OpenStreetMap contributors,

Alaska Statewide Digital Mapping Initiative

SDMI

Established in 2006

Cooperative program endorsed by the Governor implemented by six state Departments and the University

SDMI members

- University of Alaska (UA)
- Natural Resources (DNR)
- Military Veteran's Affairs (DMVA)
- Transportation and Public Facilities (DOTPF)
- Environmental Conservation (DEC)
- Fish and Game (DFG)
- Commerce Community and Economic Development (DCCED)

Governed by Executive Team of senior managers from the agencies

Informed by agency Technical Advisory Group made up of technical members from the agencies

Primary Goals

Acquire new and better maps for Alaska

Make existing map products more easily available

Statewide

SDMI seeks to make ongoing improvements to Alaska maps on a **broad, statewide scale.**

Alaska mapping status

Alaska is the only state in the nation lacking current, accurate, high-resolution maps.

Shout out to Hawaii our historical partner in being excluded in National mapping activities

Alaska *statewide* base-maps

USGS DRGs - the 1950's to 1980's

source for most of the NED in alaska

NASA's AHAP (spy plane) 1978-1986

not digitized, mosaiced, or orthoed

NASA BlueMarble NG 2004

Wednesday, April 18, 12

2007 SDMI established

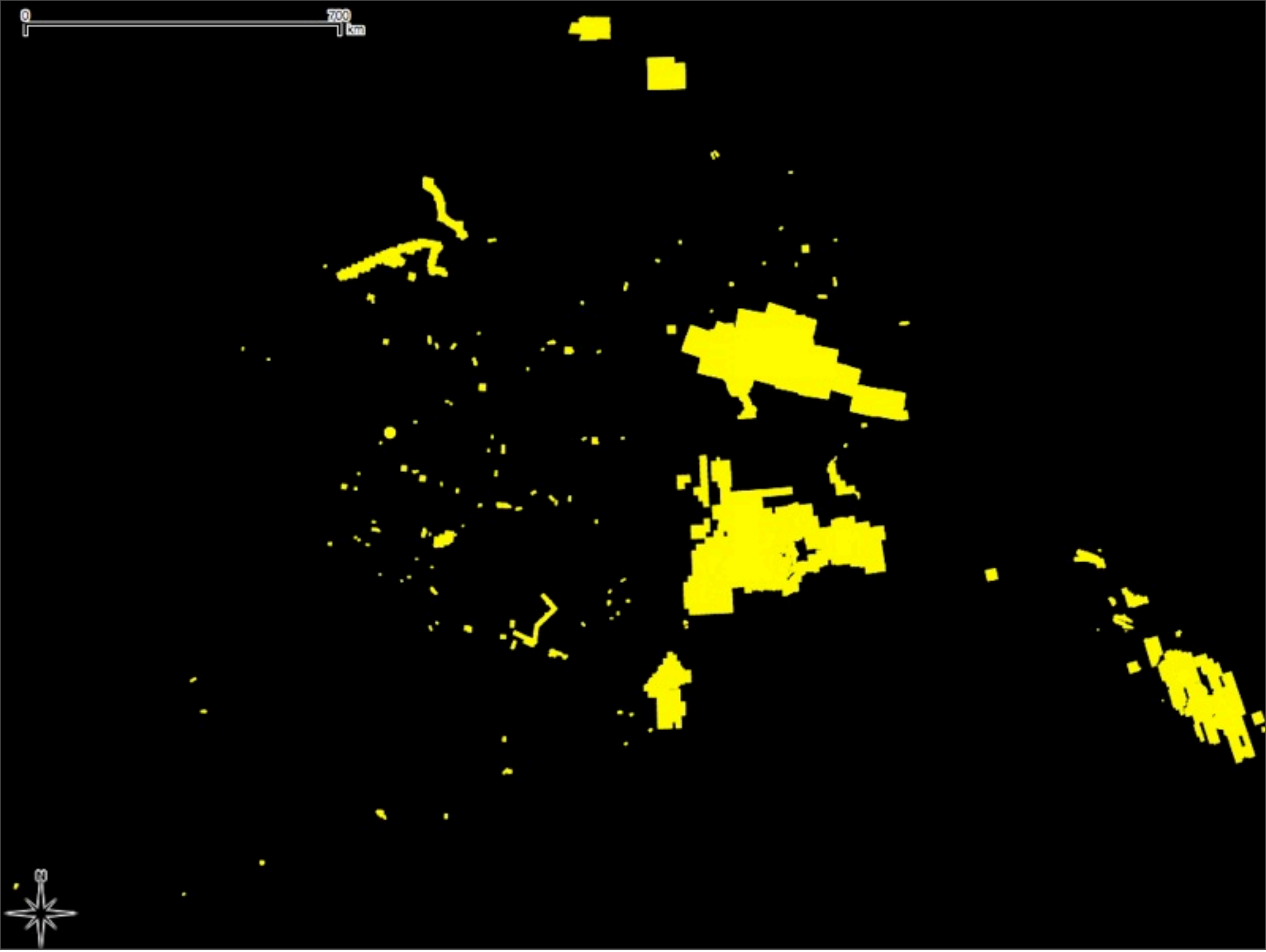
Inventory data already purchased but not accessible to others.

Partnered with Feds to uplift datasets too restricted to be useful outside of the group or project.

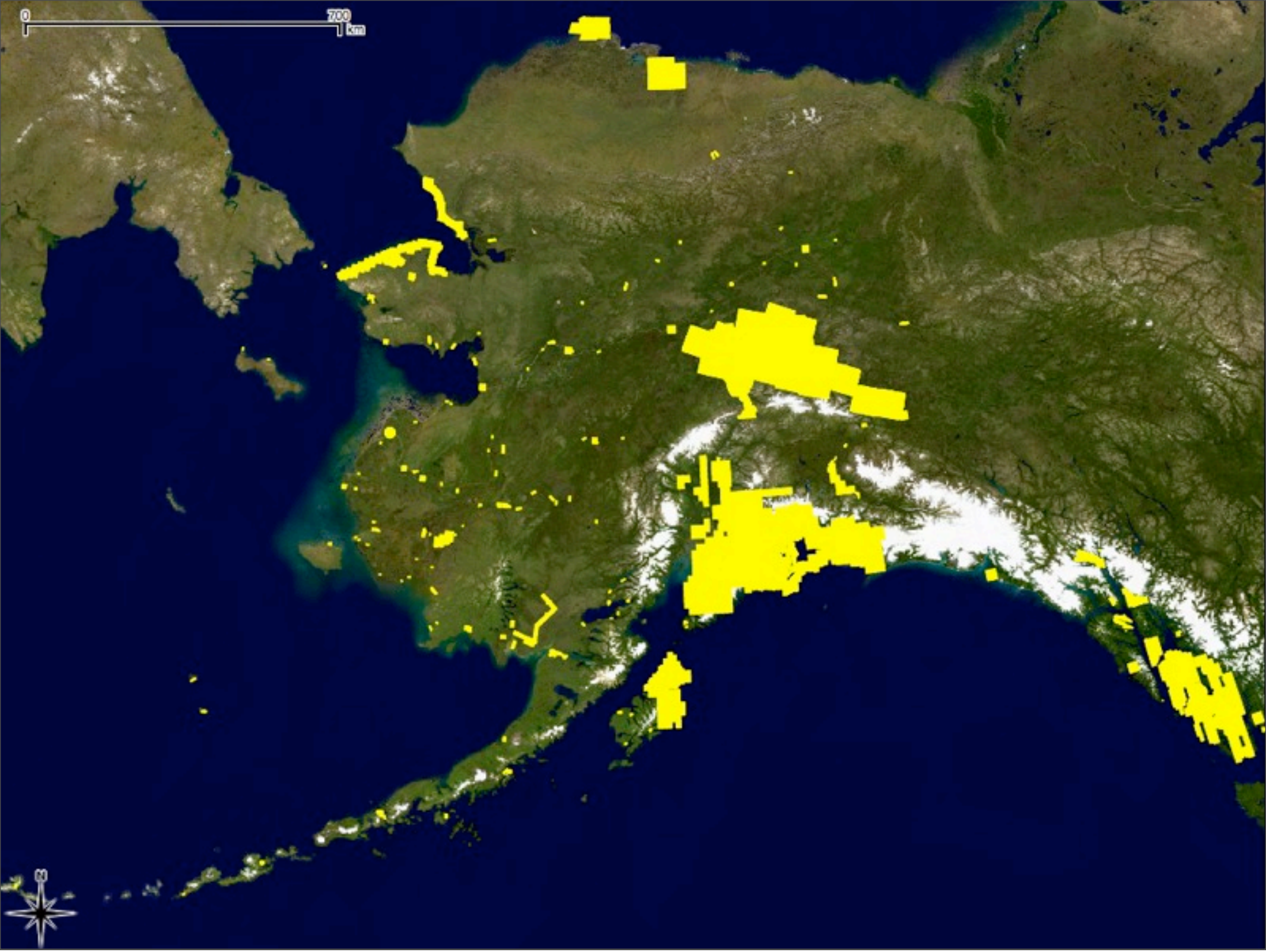
Create public archive

Take the appropriately licensed data collected, archive it, and create an interface that lets users discover and download the data from the archive

browse.alaskamapped.org



Wednesday, April 18, 12



Wednesday, April 18, 12

Shout out to NRCS

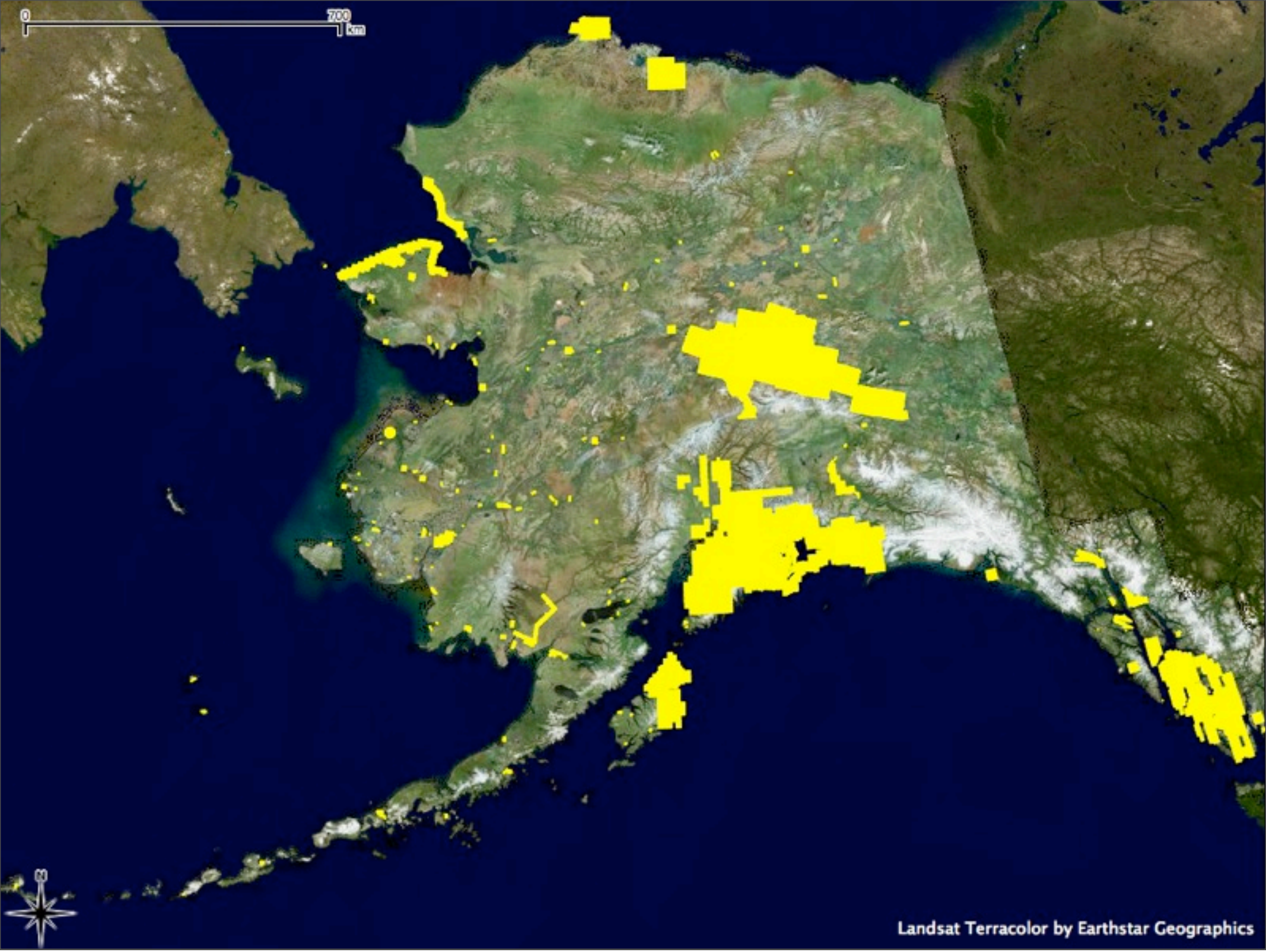
Their DOQQ work was one of the biggest contributors to the archive and they were very helpful on the uplift front

Create a public basemap

BlueMarble NG + a newly licensed copy of the Landsat TerraColor 2007 gave us a start.

Then start layering on the high resolution archive.


0
700
km
Landsat Terracolor by Earthstar Geographics



Wednesday, April 18, 12

elevation data too

USGS NED, ASTER GDEM v1 (and now v2), random LIDAR, IfSAR, SPOT HRS

Served as rasters via WMS and gridded data via WCS

ALASKA MAPPED

SDMI
Statewide Digital Mapping Initiative

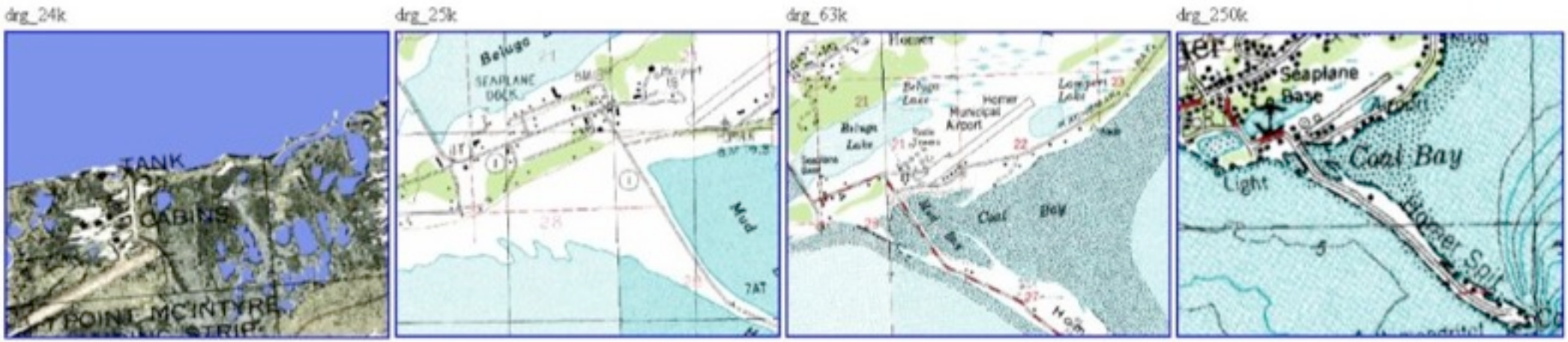
SDMI BDL

Best *available* Data Layer

imagery base layer

ALASKA MAPPED

SDMI
Statewide Digital Mapping Initiative



Best Data Layer
- Scale-dependent
- SDMI ortho integration
- Great Alaskan baselayer

USGS DRG (topos)
Psuedo-color Landsat 15-m
Landsat pan 15-m

Shaded relief NED
NOAA raster nautical charts
Blue Marble
AVHRR 1-km
MODIS 250-m
Shaded relief ASTER GDEM
Kenai Lidar
plus others....

OGC Web Services

WMS

KML

WCS

WFS

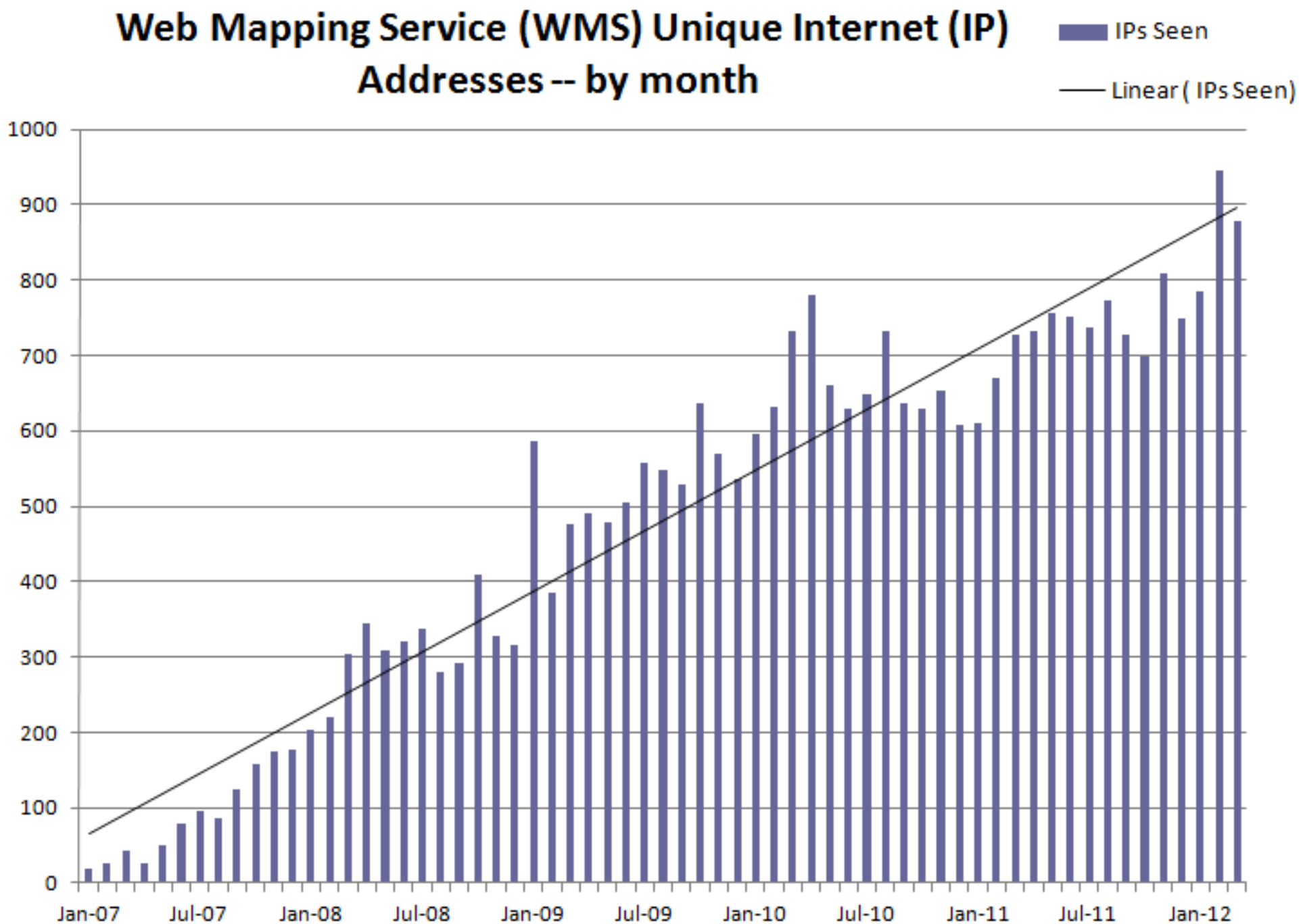
Tiles

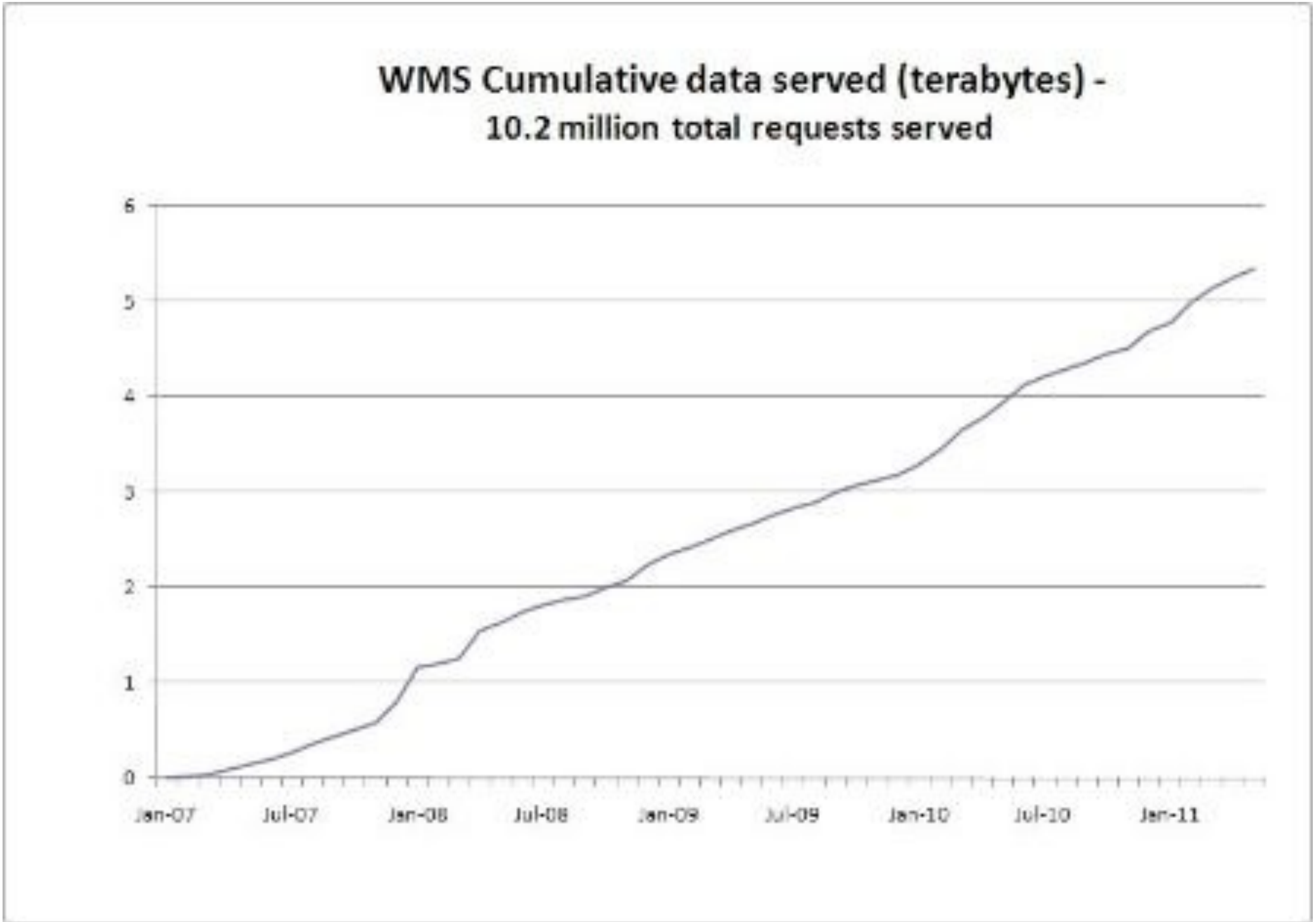
Google Maps
ESRI ArcGIS Online
Microsoft Bing
OpenLayer

was that useful?

count number of unique IPs using the WMS

Flawed because all of the State of Alaska users show up as a single IP but whatever


Web Mapping Service (WMS) Unique Internet (IP) Addresses -- by month
IPs Seen
Linear (IPs Seen)
1000
900
800
700
600
500
400
300
200
100
0
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11
Jul-11
Jan-12


WMS Cumulative data served (terabytes) -
10.2 million total requests served
6
5
4
3
2
1
0
Jan-07
Jul-07
Jan-08
Jul-08
Jan-09
Jul-09
Jan-10
Jul-10
Jan-11

16,758 WMS requests

109,000 tiles served

in the first week of April 2012

so far just an archive and some useful services

Tackling the basemap

Get user and stakeholder feed back

2008 User survey

Imagery, elevation, control all needed
Refresh cycle (3 year imagery, 10+ elevation)
Access to data and metadata
Methods to pool resources for better leveraging

2008 DEM workshop and whitepaper

2009 Imagery workshop and whitepaper

SDMI ortho and DEM programs launched

Split remaining capital funds between a statewide ortho mosaic program and an elevation collection

ALASKA MAPPED

SDMI
Statewide Digital Mapping Initiative

2010 elevation collection

Money from

NGA

State of Alaska

USGS

NRCS, BLM, and NPS

2010 USGS task order

- ORIs with ≤5-meter pixels; 1:24,000-scale horizontal accuracy
- DSMs and DTMs with 5-meter posts; DTM vertical accuracy:
  - LE90 = 3m for 0-10°, 6m for 10-20°, 9m for 20-30°, 12m for >30° slopes
- Hydro-enforced lakes, double-line drains (monotonic), coastal waters, shorelines and islands
- Resampled 30' x 30' quarter cells and 15' x 15' tiles
- Second format (HRTe3) for NGA
- FGDC compliant metadata (3 formats)
- For $ available, maximize 1-degree cells based on government priorities; initial goal was for ≥20 cells
- Intense "coopetition" with three "best and final" quotes from Fugro and Intermap allowed 28 1° cells to be mapped

slide from Dave Maune

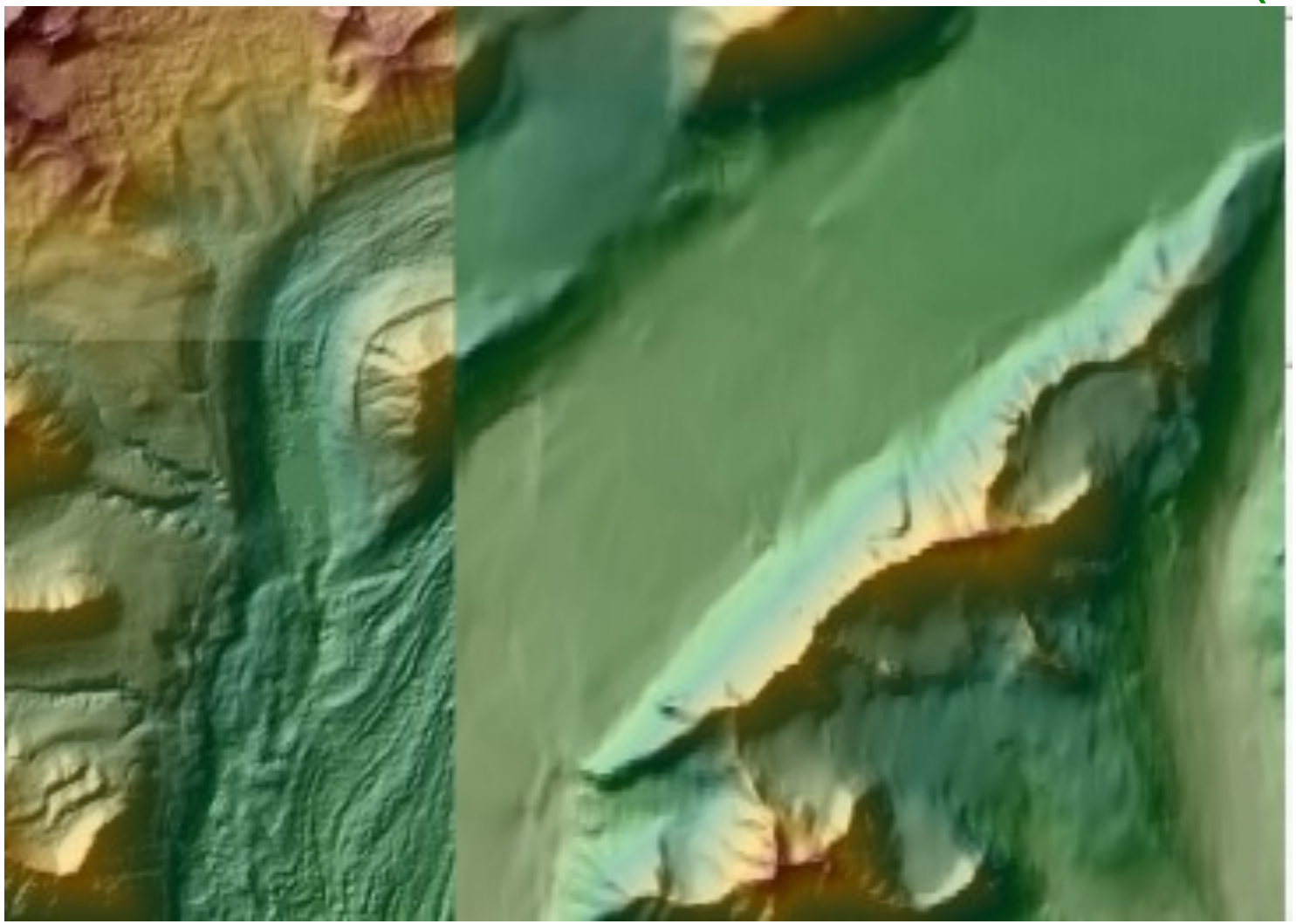
Dewberry

SDMI 2010 IFSAR

Dewberry prime

Intermap and Fugro tasked with the work

Resolution/content significantly better than the National Elevation Dataset (NED)

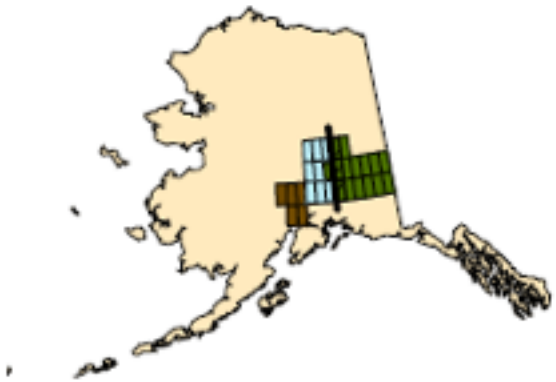


IFSAR (left) and NED (right)

slide from Dave Maune

Alaska IFSAR Tracking

1:3,144,573



INTERMAP

FUGRO

5 4 3 2 1

14 13 12 11 10 9 8 7 6

29 30 19 18 22 21 17 16 32 20 31 15

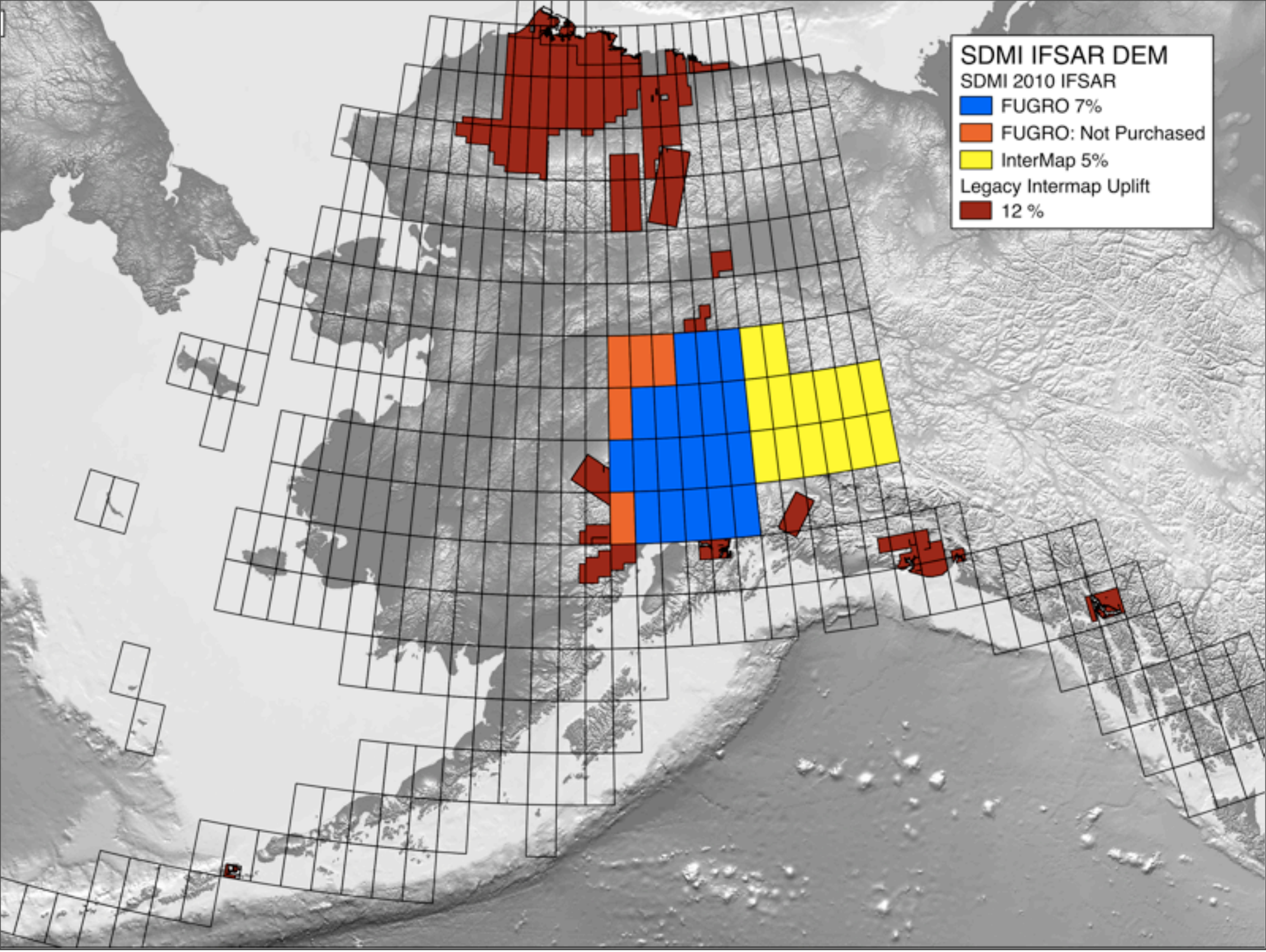
24 23

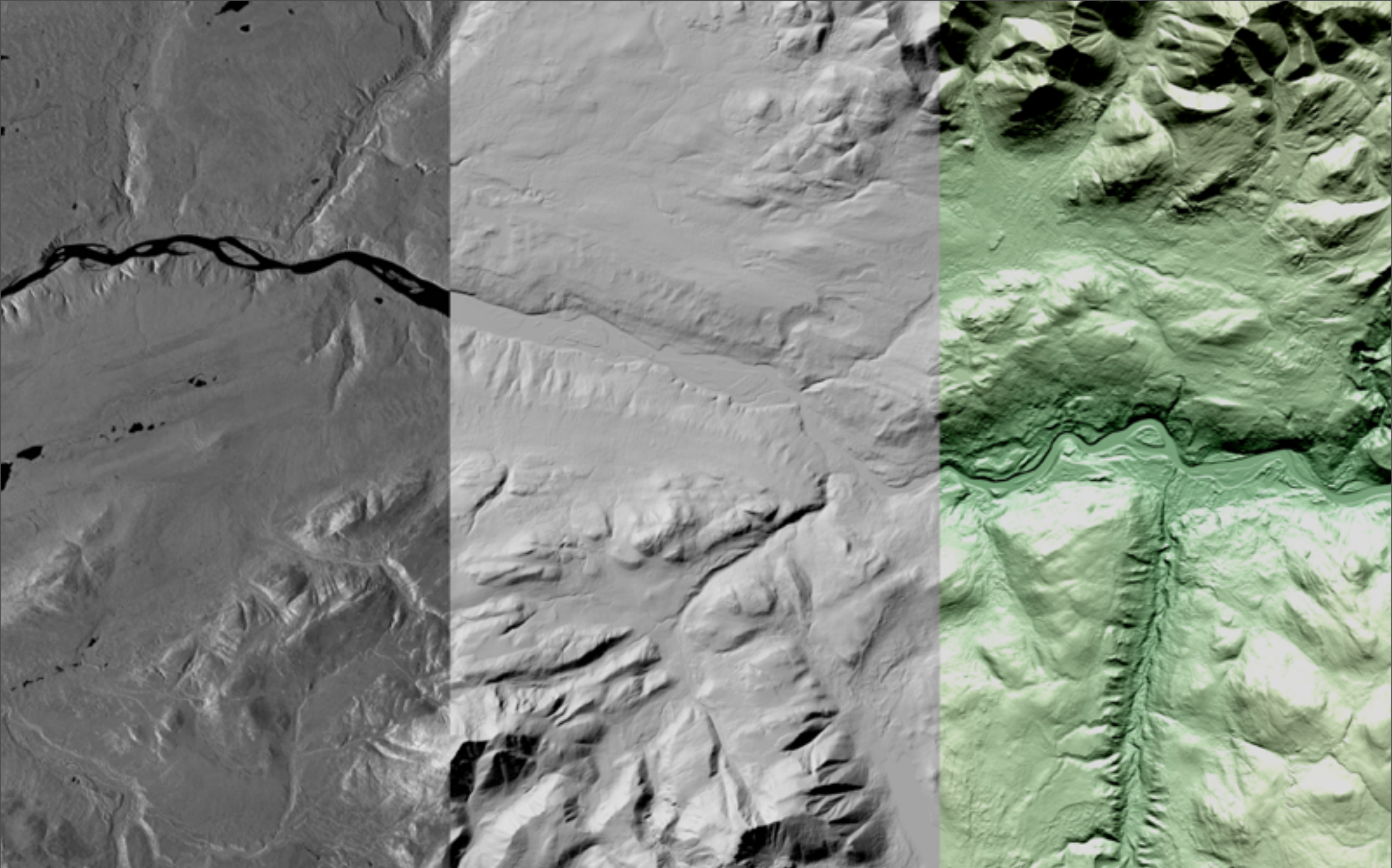
N

NAD 1983 Alaska Albers
10 January 2012
Denver NGTOC

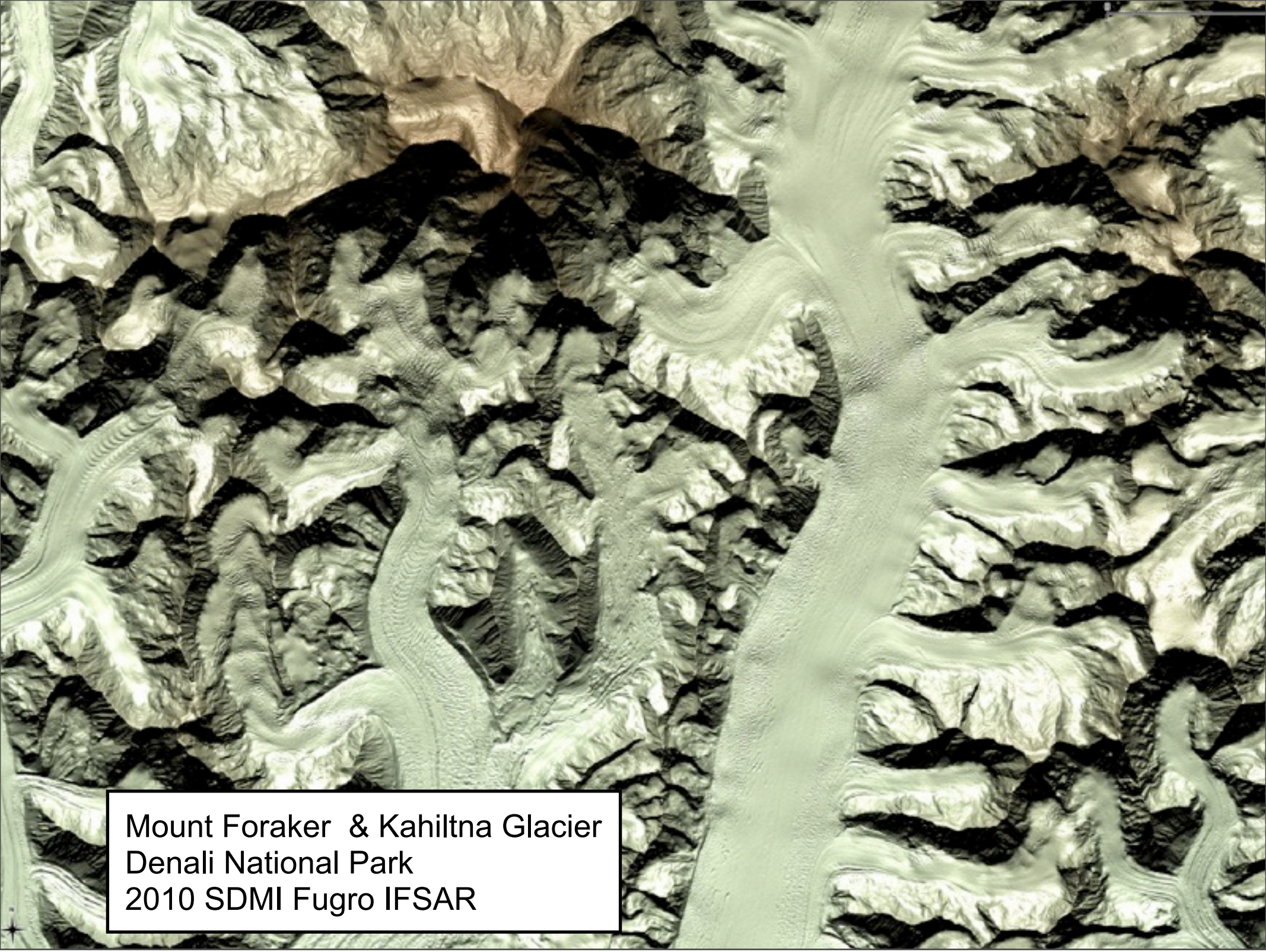
Legend

- Boundary_Line
- Received most recent edge-matched data at NGTOC
- Currently in QA Process at NGTOC: Estimated Completion Date 03 February 2012
- Currently in QA Process at NGTOC: Estimated Completion Date 28 February 2012
- Accepted Cells


SDMI IFSAR DEM
SDMI 2010 IFSAR
FUGRO 7%
FUGRO: Not Purchased
InterMap 5%
Legacy Intermap Uplift
12 %



SDMI IFSAR ORI, DSM, and DTM near proposed Watana Dam


Mount Foraker & Kahiltna Glacier
Denali National Park
2010 SDMI Fugro IFSAR

Intermap IFSAR delivery accepted and integrated into USGS NED
Soon to be available from AlaskaMapped

First delivery of Fugro IFSAR received by State in March and going through State acceptance

Legacy Intermap IFSAR just received by Dayne last week .. dunno what that looks like yet

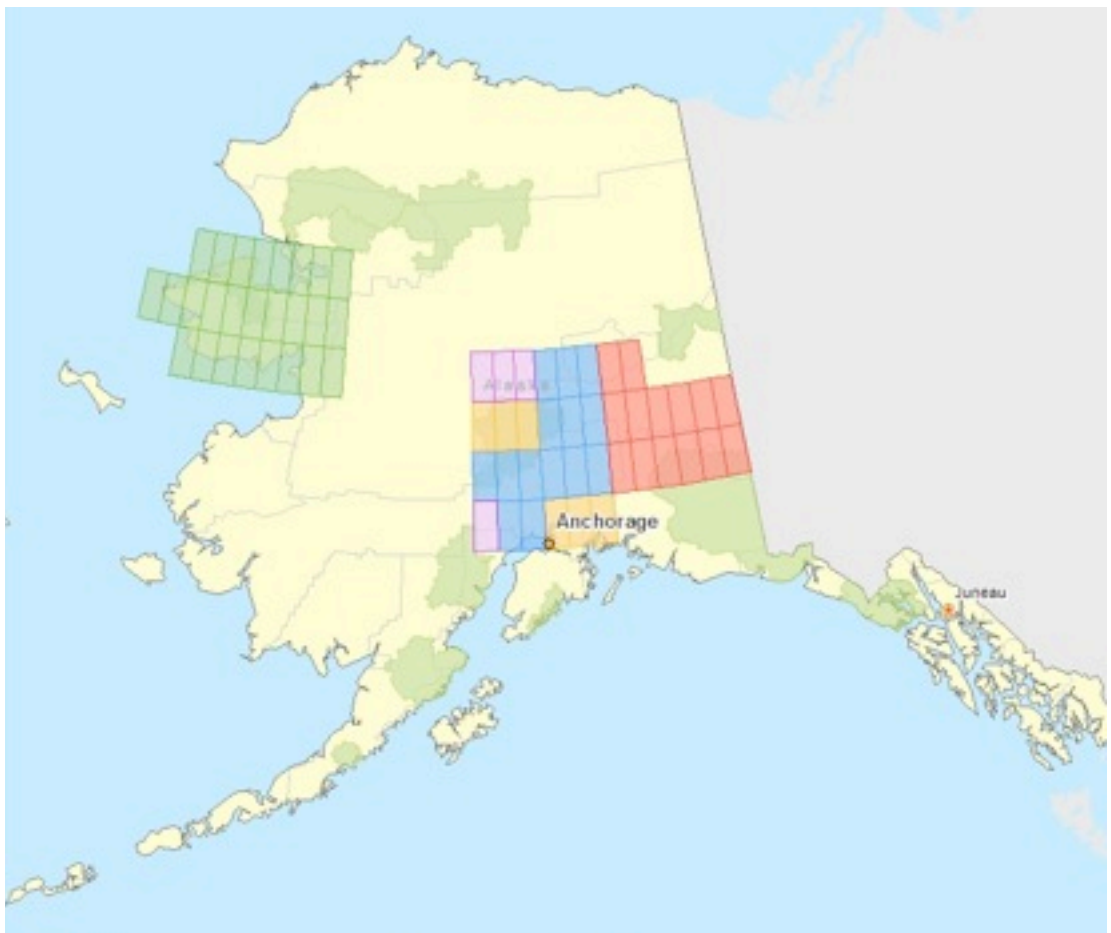
One more delivery of Fugro cells expected in coming months to finalize 2010 IFSAR collection and delivery

Future status

Still some 2010 spec-collected Fugro cells to be purchased if funding becomes available

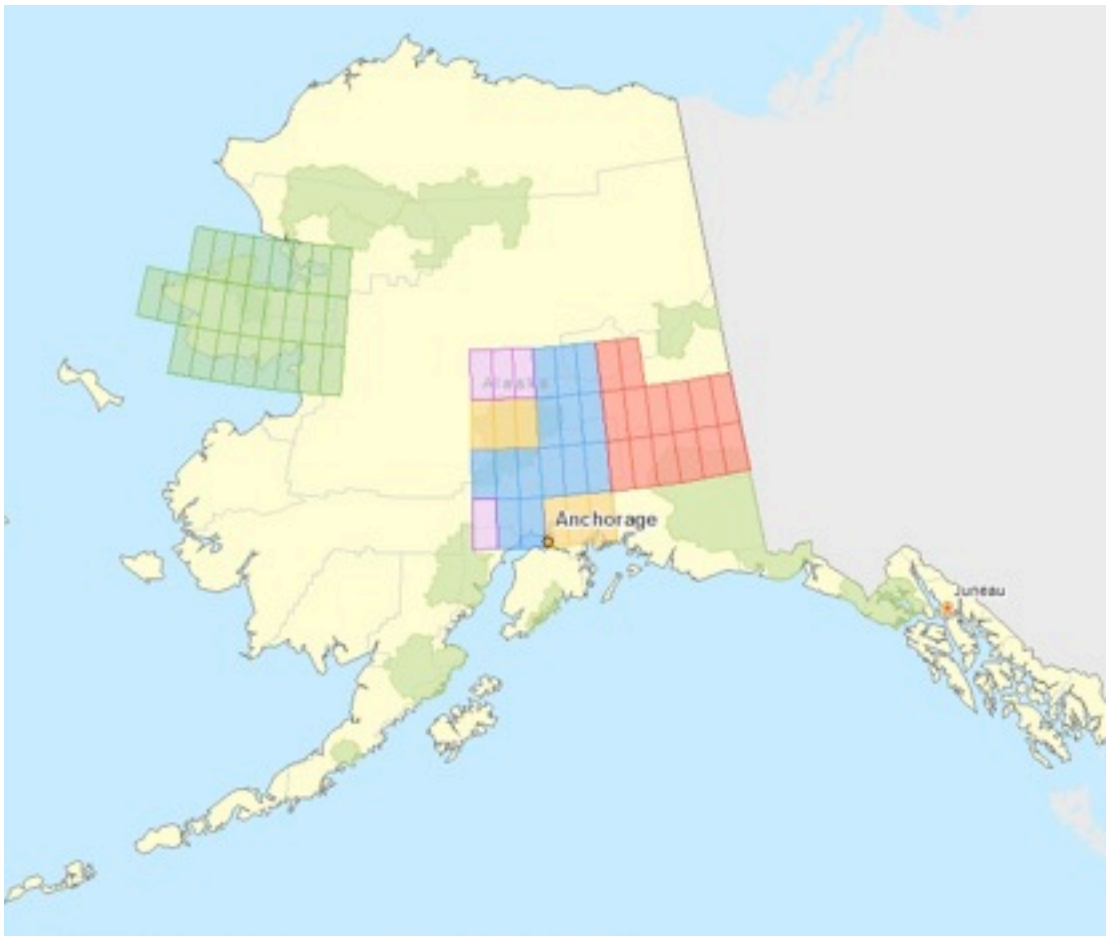
The Governor of Alaska interested in funding a 2012 collection in North-West Alaska.

Acquisition Areas



slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

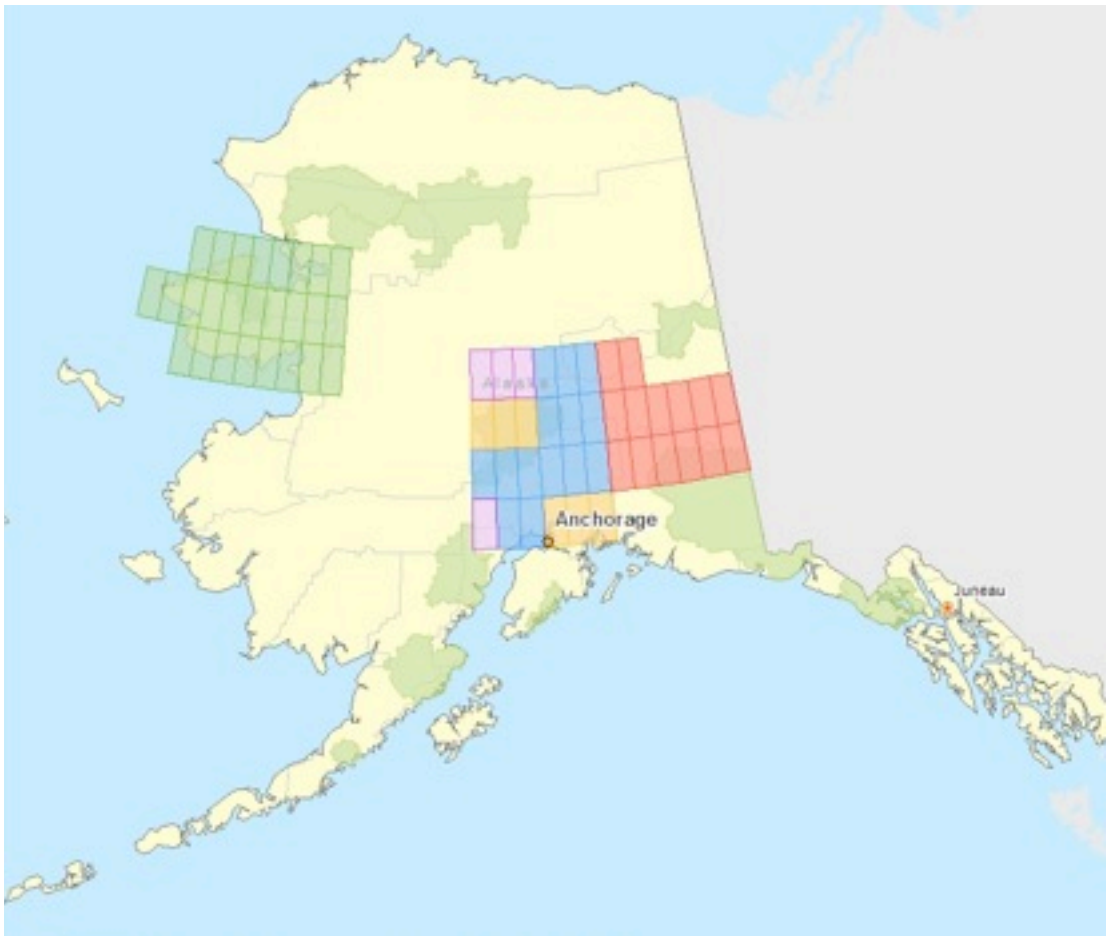
Acquisition Areas



- Red, Intermap, 2010

slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

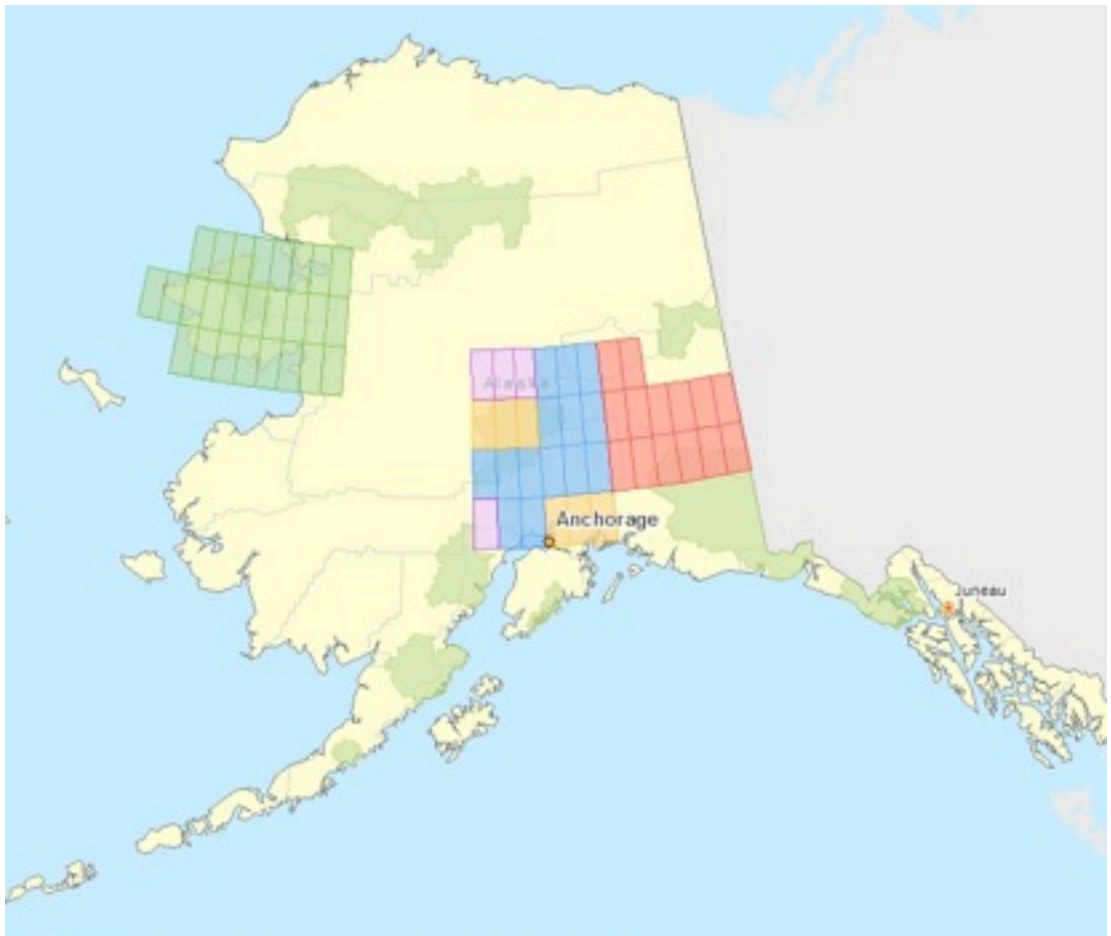
Acquisition Areas



- Red, Intermap, 2010
- Blue, Fugro, 2010

slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

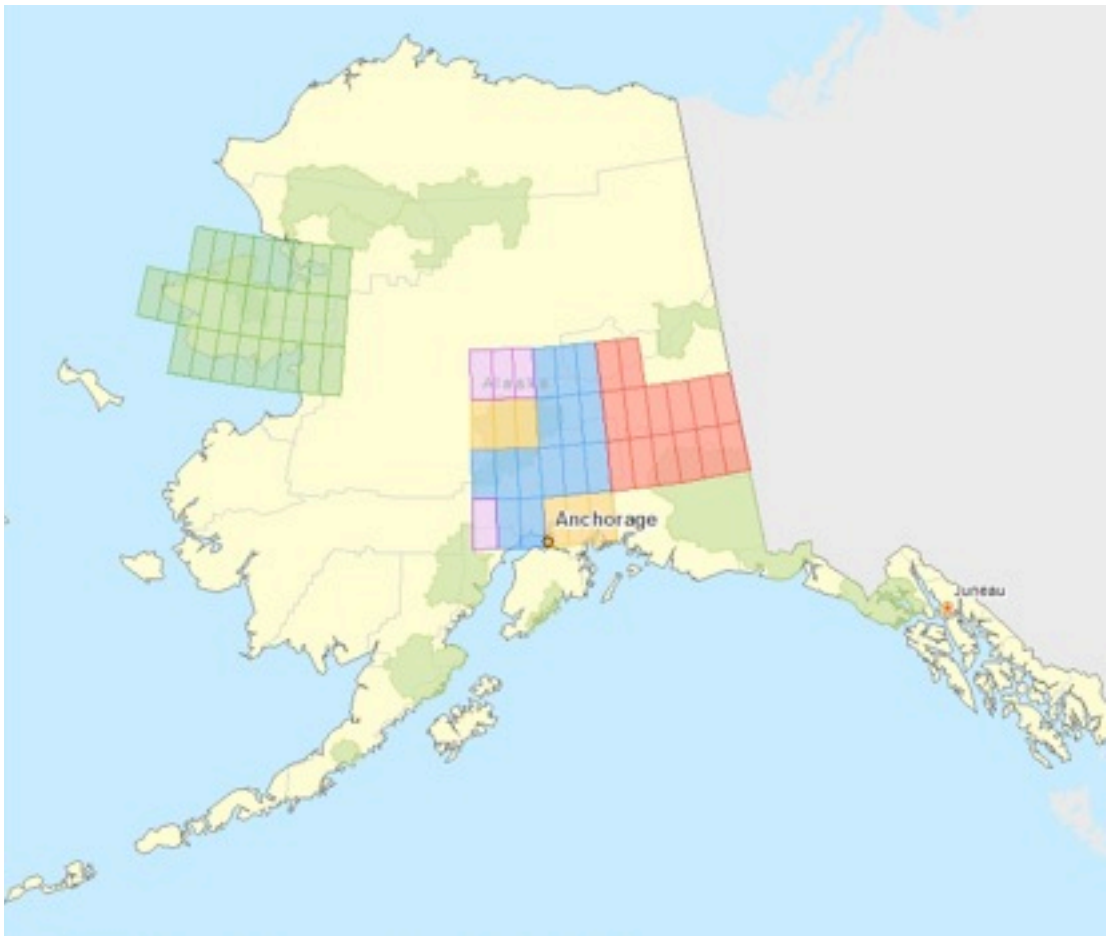
Acquisition Areas



- Red, Intermap, 2010
- Blue, Fugro, 2010
- Gold, Fugro, 2011, flown “on spec” in 2010

slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

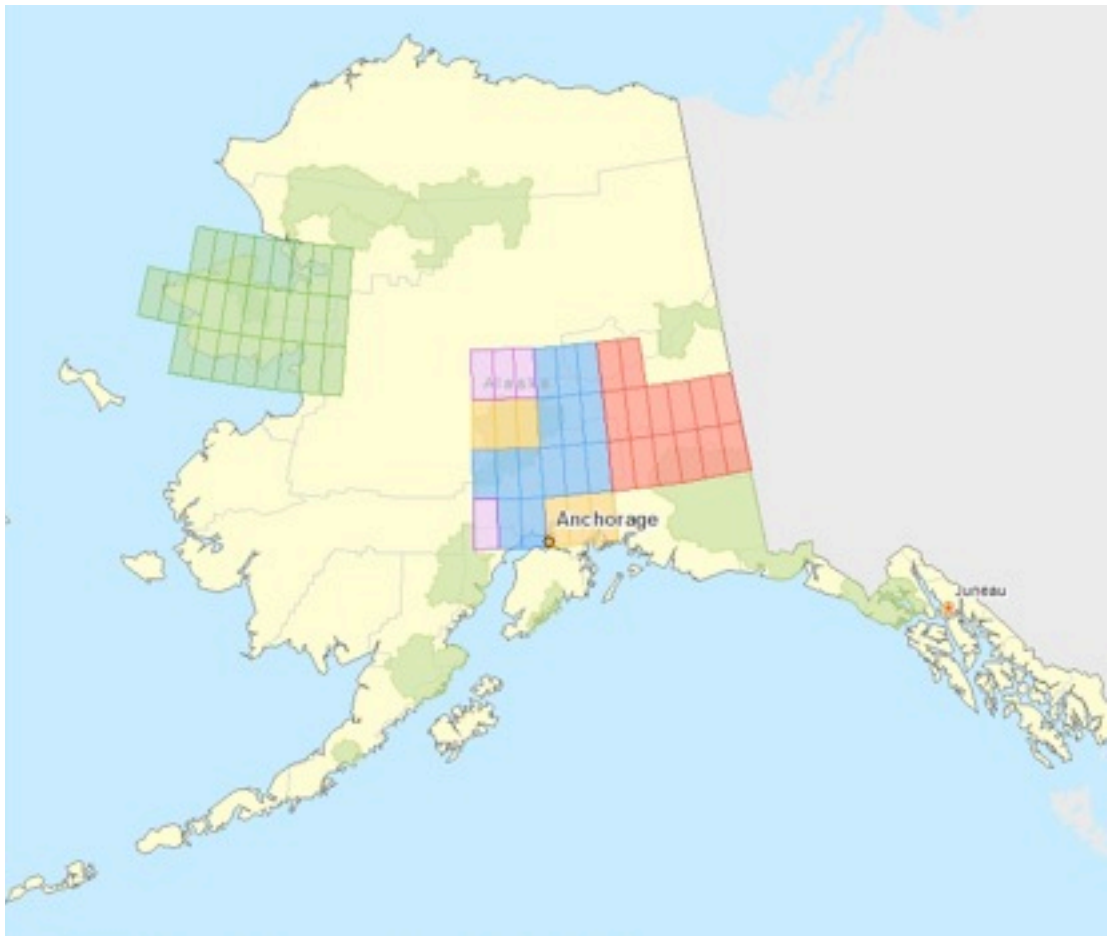
Acquisition Areas



- Red, Intermap, 2010
- Blue, Fugro, 2010
- Gold, Fugro, 2011, flown “on spec” in 2010
- Pink, not funded, flown “on spec” in 2010

slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

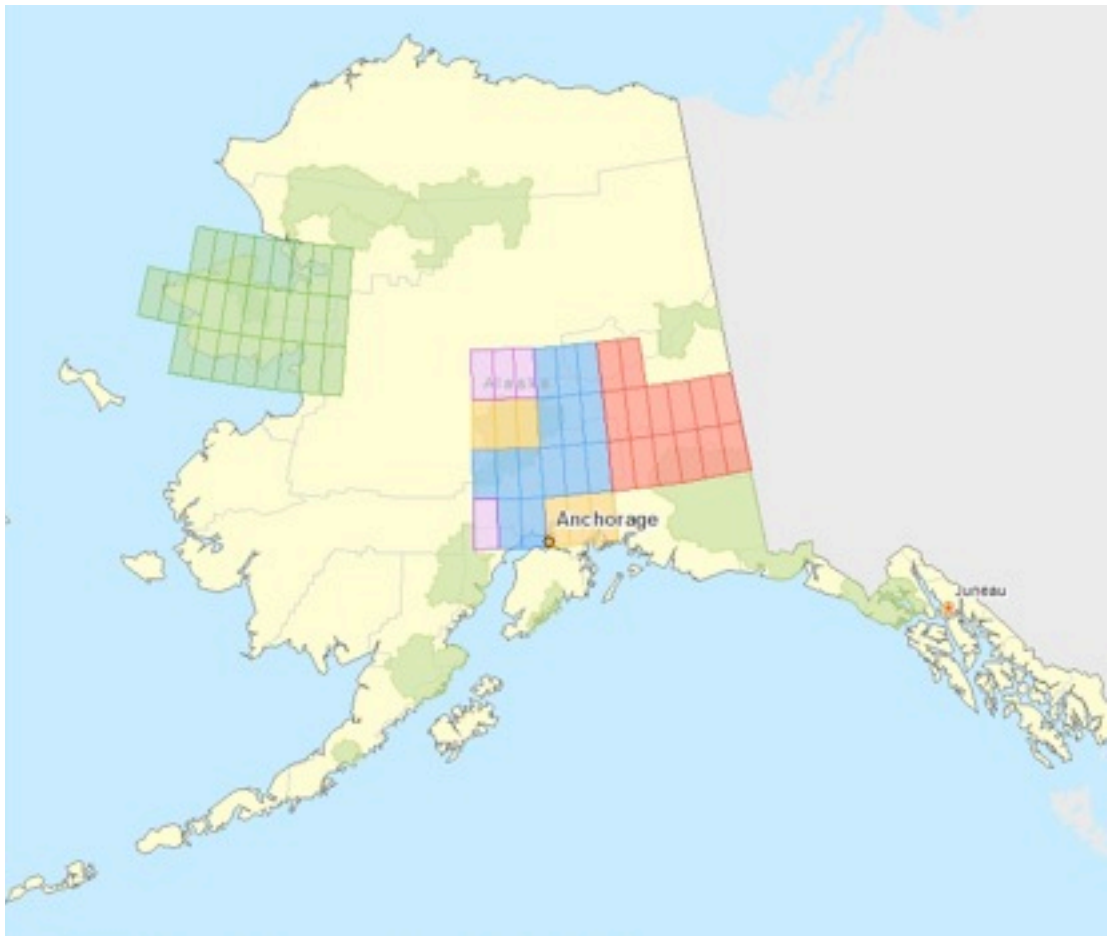
Acquisition Areas



- Red, Intermap, 2010
- Blue, Fugro, 2010
- Gold, Fugro, 2011, flown “on spec” in 2010
- Pink, not funded, flown “on spec” in 2010
- Green, Intermap, 2012 (acquisition only)

slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

Acquisition Areas



- Red, Intermap, 2010
- Blue, Fugro, 2010
- Gold, Fugro, 2011, flown “on spec” in 2010
- Pink, not funded, flown “on spec” in 2010
- Green, Intermap, 2012 (acquisition only)
- Total area funded: ~18% of Alaska

slide from Dave Maune at Alaska Surveying and Mapping Conference 2012

2009 Imagery workshop and whitepaper

SDMI ORTHO

Statewide ortho mosaic that meet 1:24k mapping standards

CE90 of 12.2m

3x accuracy improvement over most existing maps of Alaska

Ortho imagery funders

BOEM Coastal Impact Assistance Program

Alaska Statewide Digital Mapping Initiative

Aerometric Prime

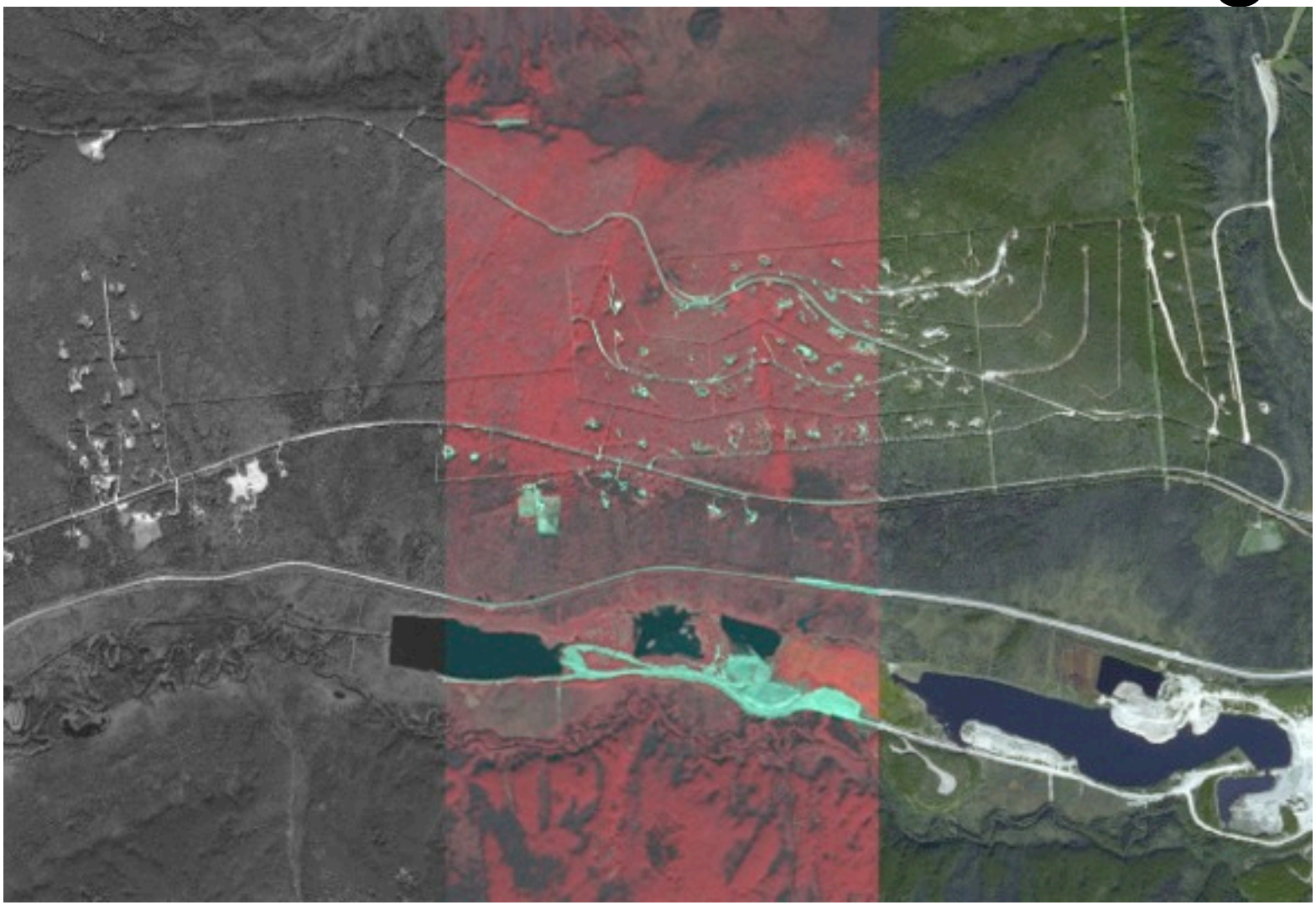
Astrium's SPOT5 providing source data

Fugro Earthdata turning it into map

Start: August 5th, 2010

End: June 30th, 2014

SDMI Statewide Ortho-imagery



Providing a 2.5m color-infrared, psuedo-natural color, and greyscale statewide basemap for Alaska
From a 5 year range (2009 - 2014)

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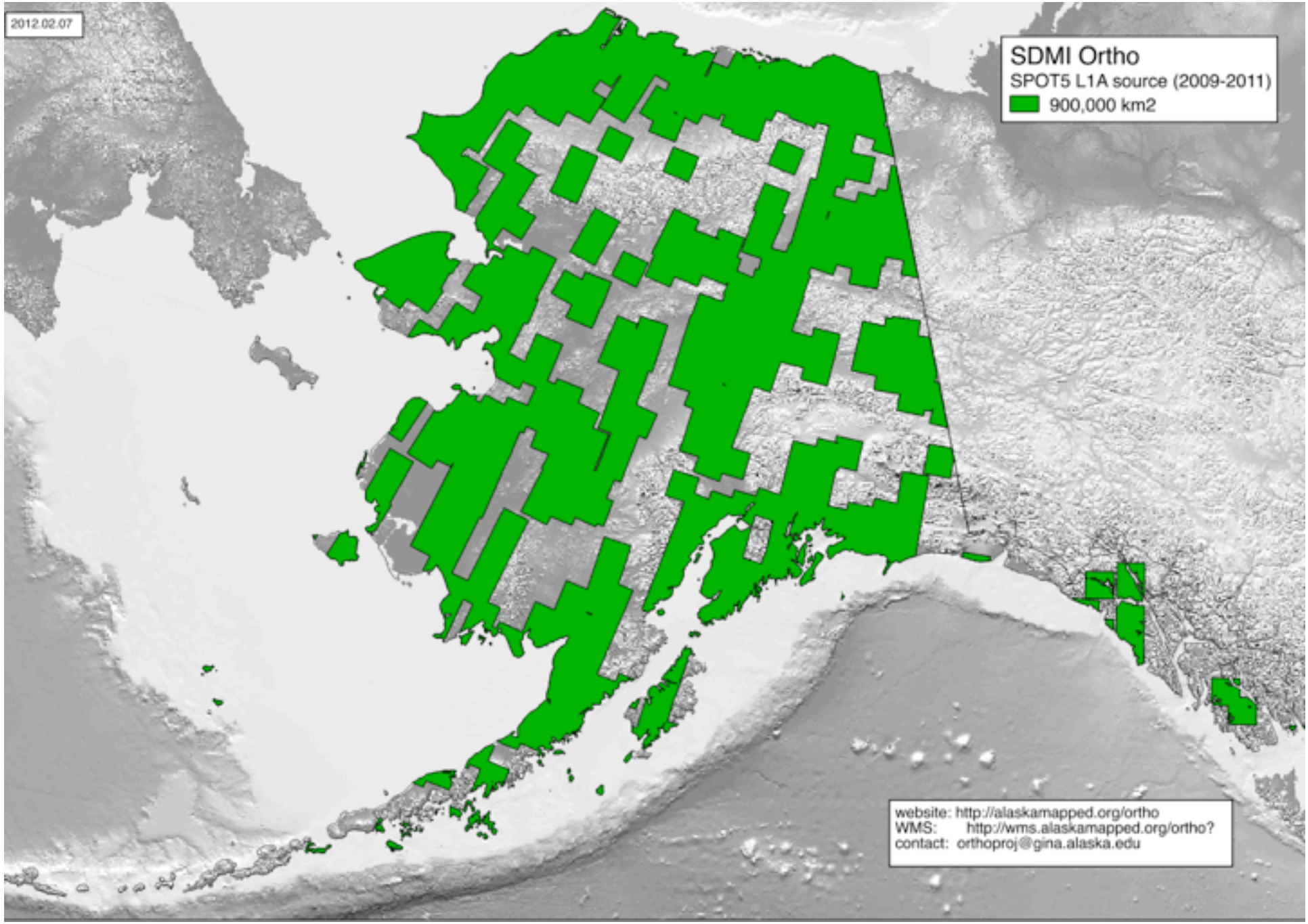

Source imagery (SPOT5) collection (green)
900,953 km2 (52%) at end of 2011 season

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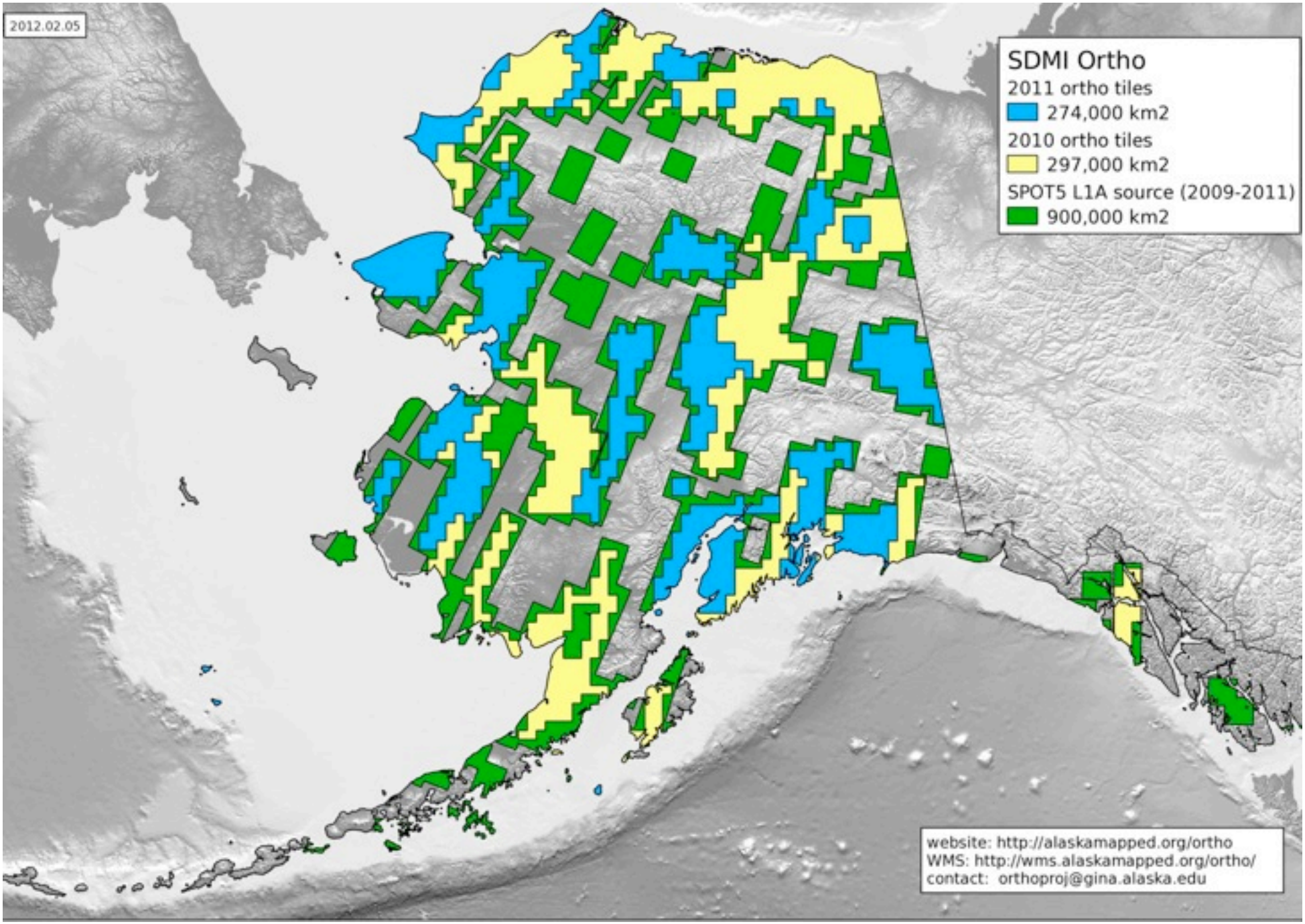

2010 final ortho tiles (yellow) available now
297,000 km2 (17%)

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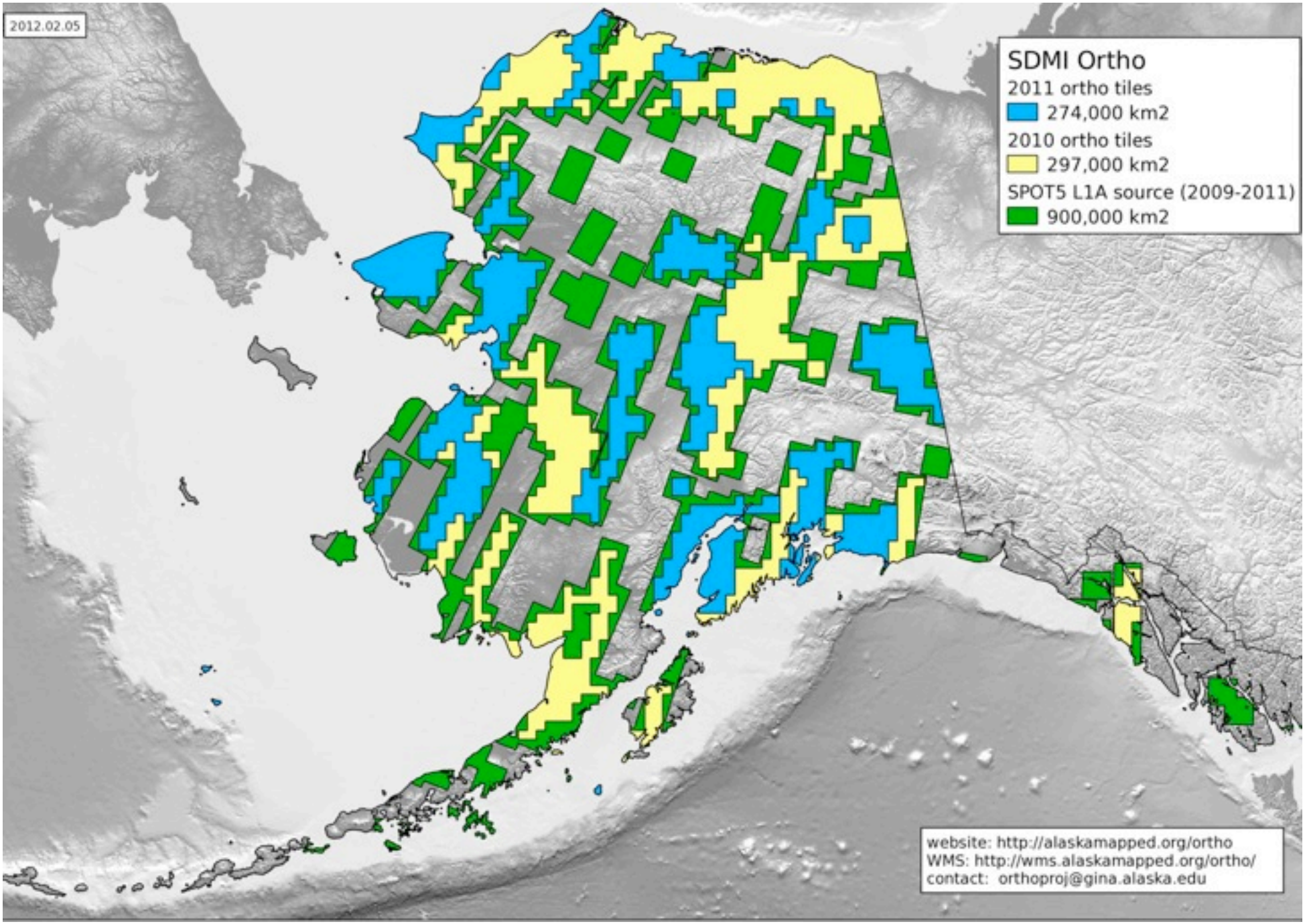

2011 ortho tiles (blue) by fall of 2012.
36% coverage of ortho tiles after 2011 delivery

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Natural Color at full 2.5-meter resolution

GINA
www.gina.alaska.edu

BDL NOW

Best *Available* (raster) Data Layer

badl and bard were not picked as the name

SDMI BDL - global NASA blue marble

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SDMI BDL - high res including SPOT5 now showing up as patch work

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SDMI BDL - TerraColor (Landsat 15m)
now takes over from blue marble

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SDMI BDL (best available data layer)
January 2012

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SDMI ORTHO CIR
Color Infrared on top of BDL

GINA
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SDMI ORTHO CIR
Color Infrared on top of BDL
Golovin Alaska pointed at

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real world example

Golovin Alaska

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review - Golovin in BDL - January 2012

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upgrade - SDMI Ortho RGB
http://wms.alaskamapped.org/ortho

GINA
www.gina.alaska.edu

upgrade - SDMI Ortho CIR
http://wms.alaskamapped.org/ortho

GINA
www.gina.alaska.edu

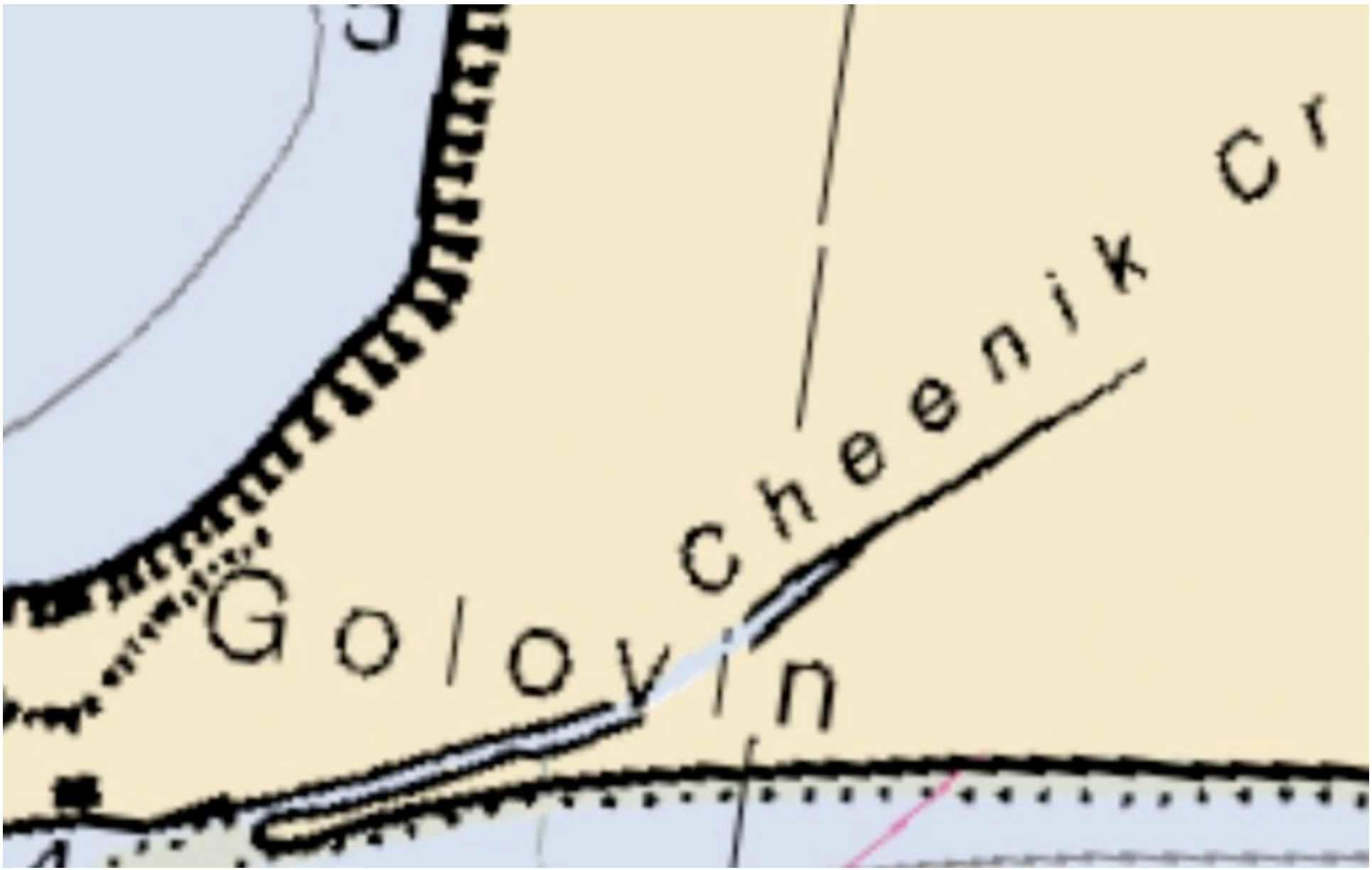
upgrade - SDMI Ortho PAN (greyscale)
http://wms.alaskamapped.org/ortho

GINA
www.gina.alaska.edu

USGS DRG

http://wms.alaskamapped.org/extras

GINA
www.gina.alaska.edu



NOAA charts

http://wms.alaskamapped.org/charts

GINA
www.gina.alaska.edu

review - Golovin in BDL January 2012

GINA
www.gina.alaska.edu

upgrade - SDMI Ortho RGB
http://wms.alaskamapped.org/ortho

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SDMI win - Golovin in BDL now
SPOT5 and DCCED Villages Imagery combo

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SDMI ortho services

- ortho tiles integrated into the SDMI BDL
- dedicated WMS for each ortho layer
  - http://wms.alaskamapped.org/ortho/
    - RGB
    - CIR
    - PAN
- Tile service end points for all the major tile consumers in custom projections for online web map applications
  - Google Earth KML
  - Google Maps
  - Bing, OpenLayers (Alaska Albers), ...
  - ESRI REST end point - usable in ESRI ArcGIS Online
- Source data download for authorized users (AEA authorized)
  - http://browse.alaskamapped.org
- Integrated in State GIS servers (DNR, Fish & Game, DOT ....)

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AlaskaMapped and GINA Tile Services

OpenLayers
- Alaskan Albers
- Web Mercator
- Polar

Google Maps
Google Earth (KML)

Bing

ESRI
- ArcGIS Online
- FLEX/REST

gina-map-layers
new library to simplify including tile layers into your web maphttp://github.com/gina-alaska

Being used by:
- DNR, DOG, F&G, NPS, DGGS, BLM, DCCED, NSSI, AEA, DMVA, FAA, DOT, NRCS, AOOS, ERMA, ... *and more!*
- Alaska GIS community!

Is it any good?

Independent QA/QC of each

ortho tile by i-cubed

ALASKA MAPPED

Alaska SDMI

Statewide Digital Mapping Initiative

Third Party Quality Assurance of SDMI Orthoimagery

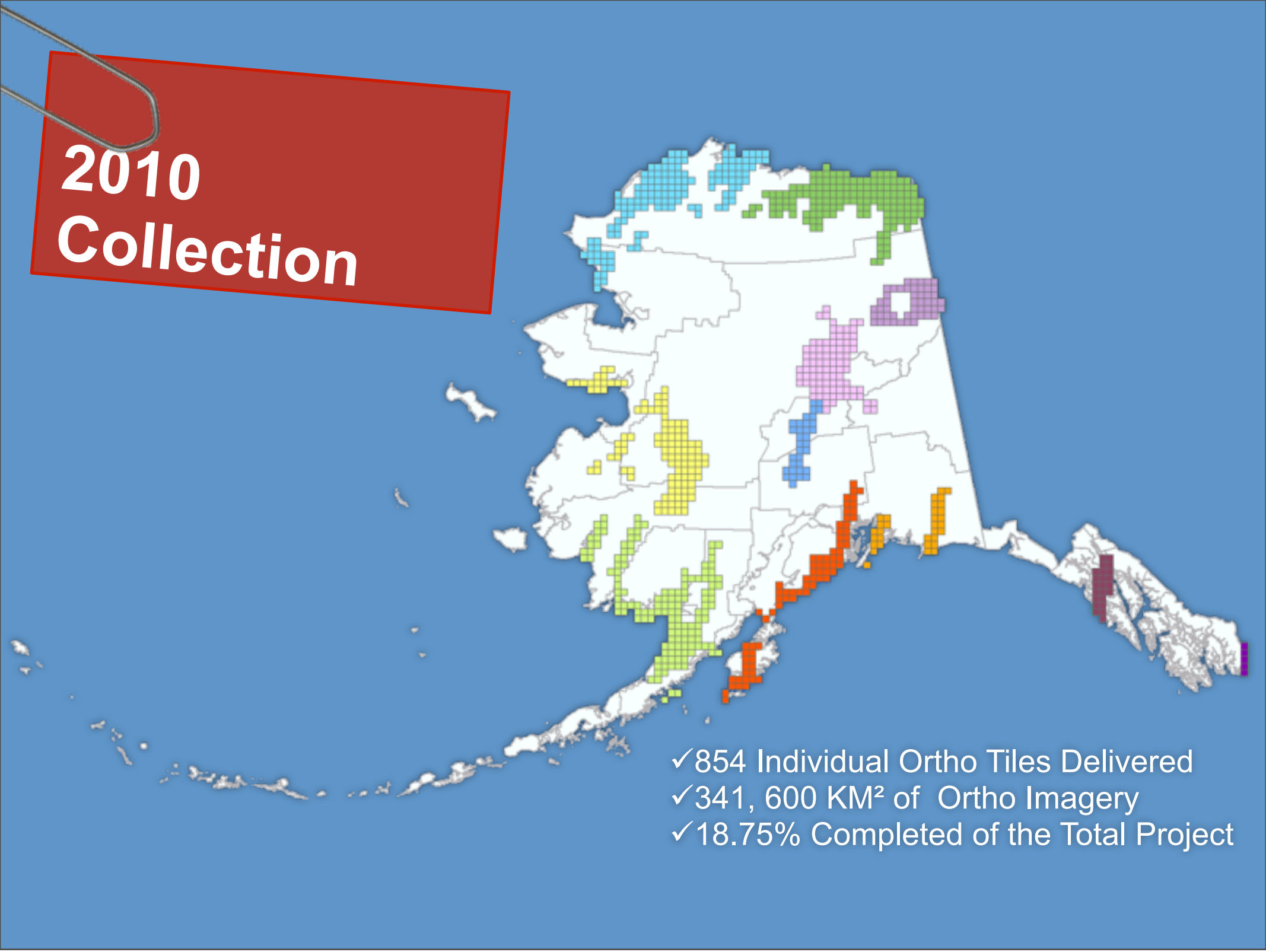
2010 Collection Season

QA-QC presentation by i-cubed

credit to: Jill Mamini & Jeremy Hale

i-cubed
CONTENT. DELIVERED.

2010 Collection



- ✓854 Individual Ortho Tiles Delivered
- ✓341, 600 KM² of Ortho Imagery
- ✓18.75% Completed of the Total Project

Quality Assurance

- ✓ Radiometric Quality
  - ➢ Cloud & Shadow
  - ➢ Haze
  - ➢ Blend
  - ➢ Contrast
  - ➢ Saturation
  - ➢ Color
  - ➢ Etc..
- ✓ Geometric Offset
- ✓ Geometric Accuracy

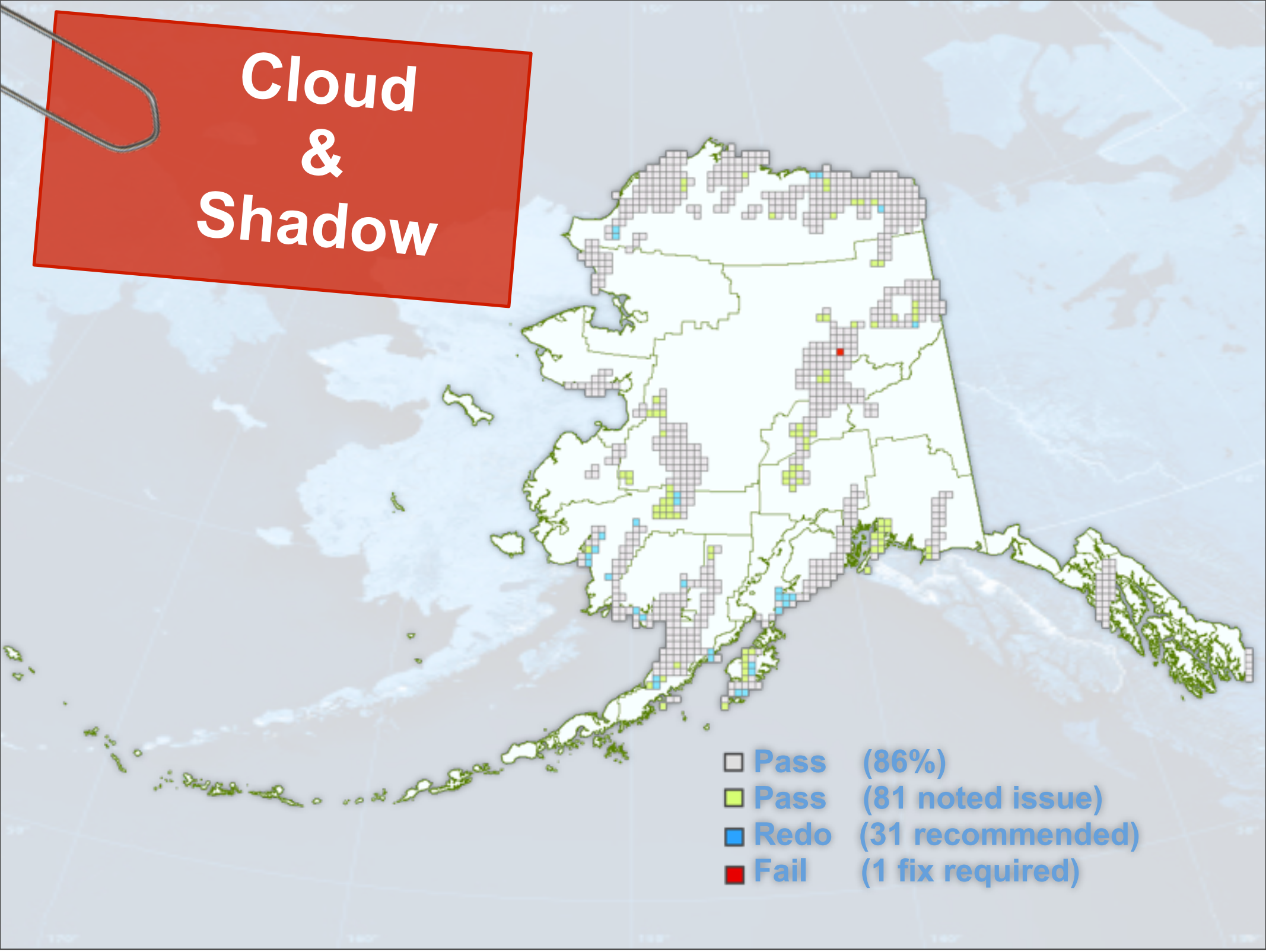
Alaska Mapped

SDMI
Statewide Digital Mapping Initiative

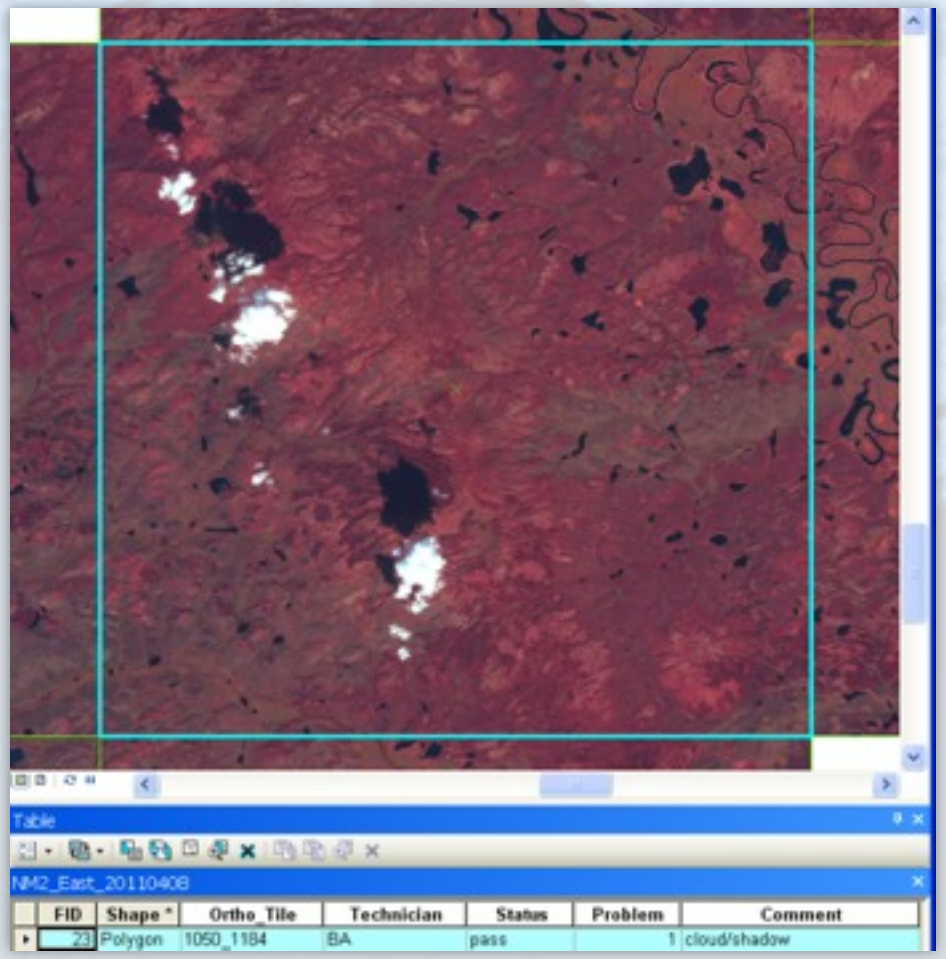
- Radiometric Quality

i-cubed
CONTENT. DELIVERED.

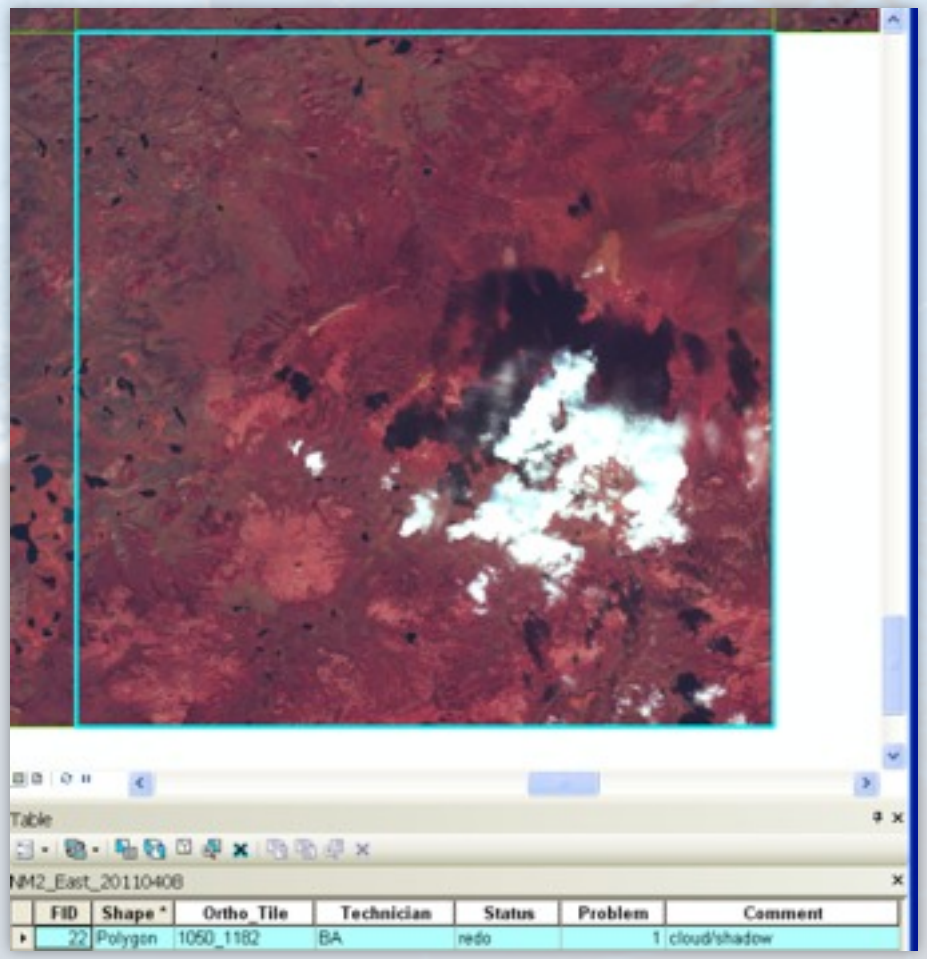
Cloud & Shadow



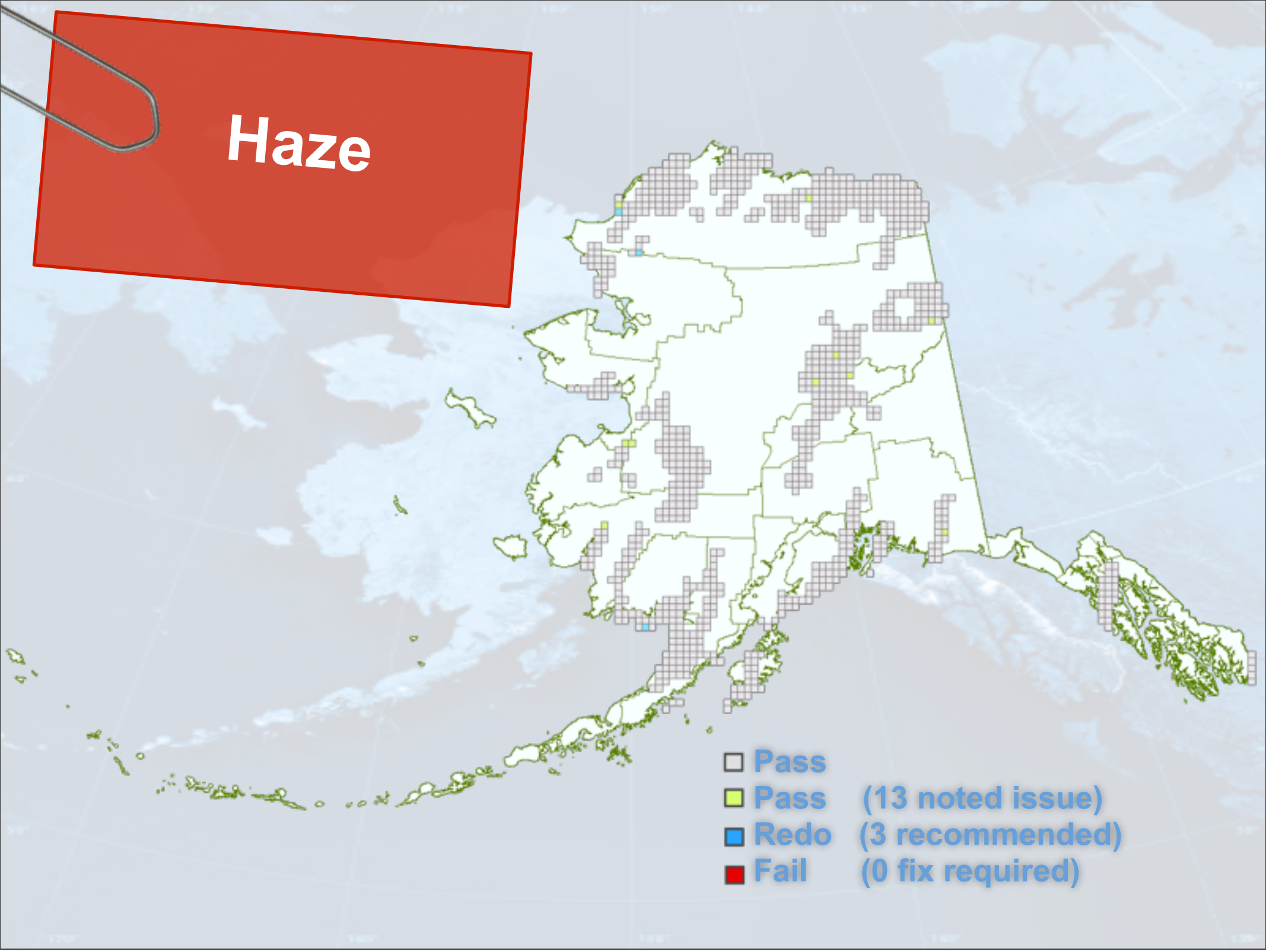
Pass
< 25%

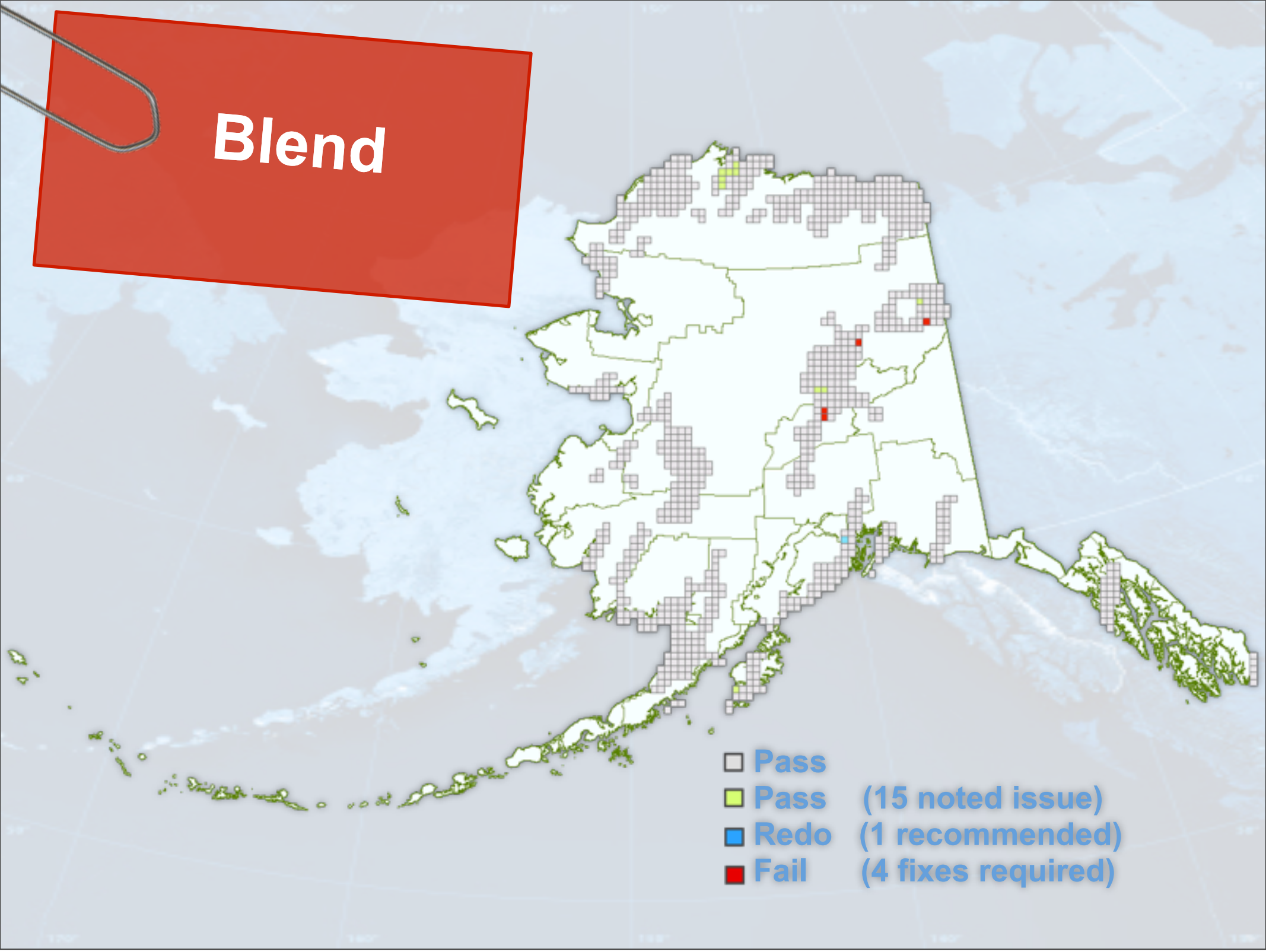


Redo
> 25%



Haze

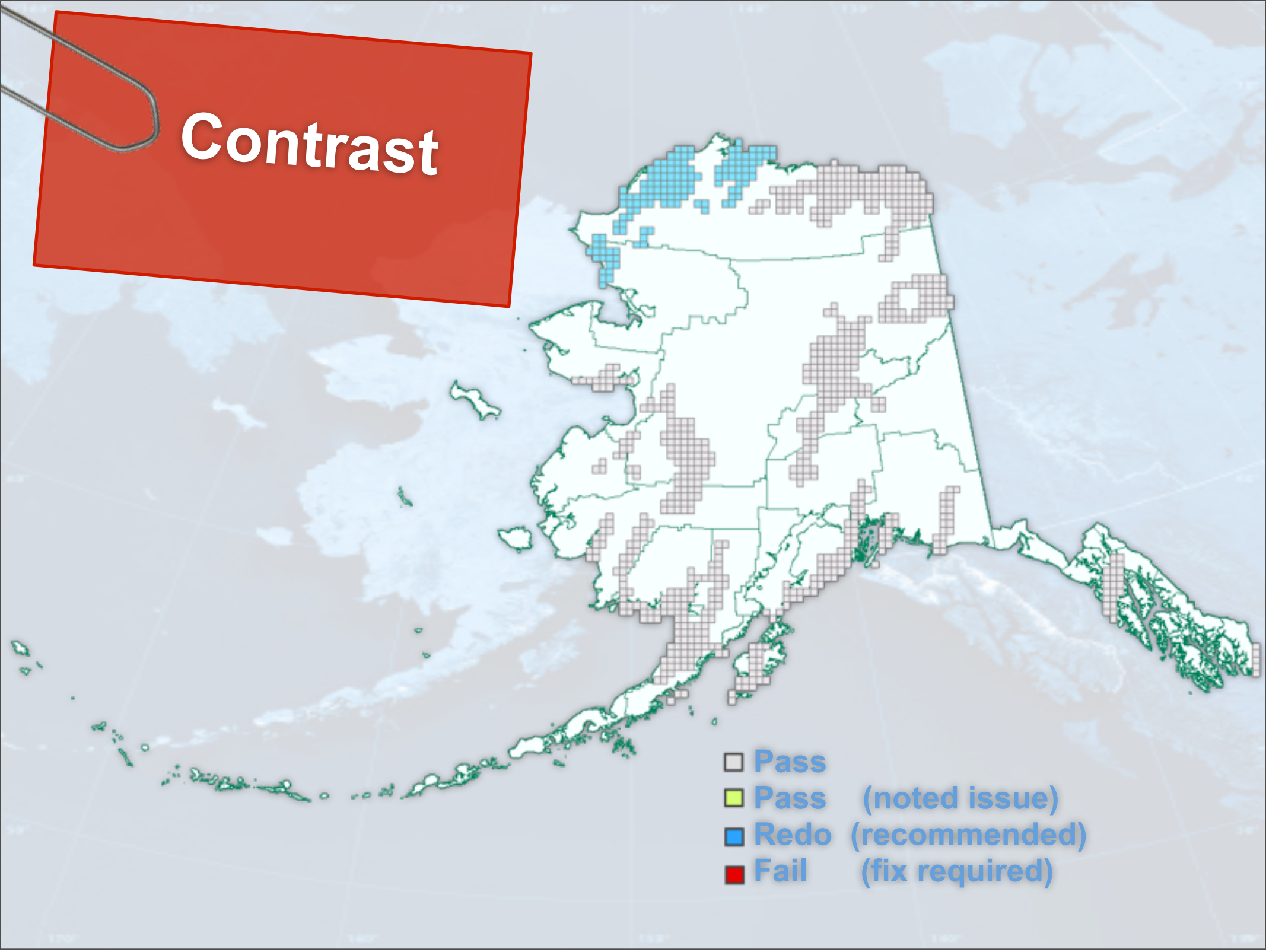

Pass
Pass (13 noted issue)
Redo (3 recommended)
Fail (0 fix required)



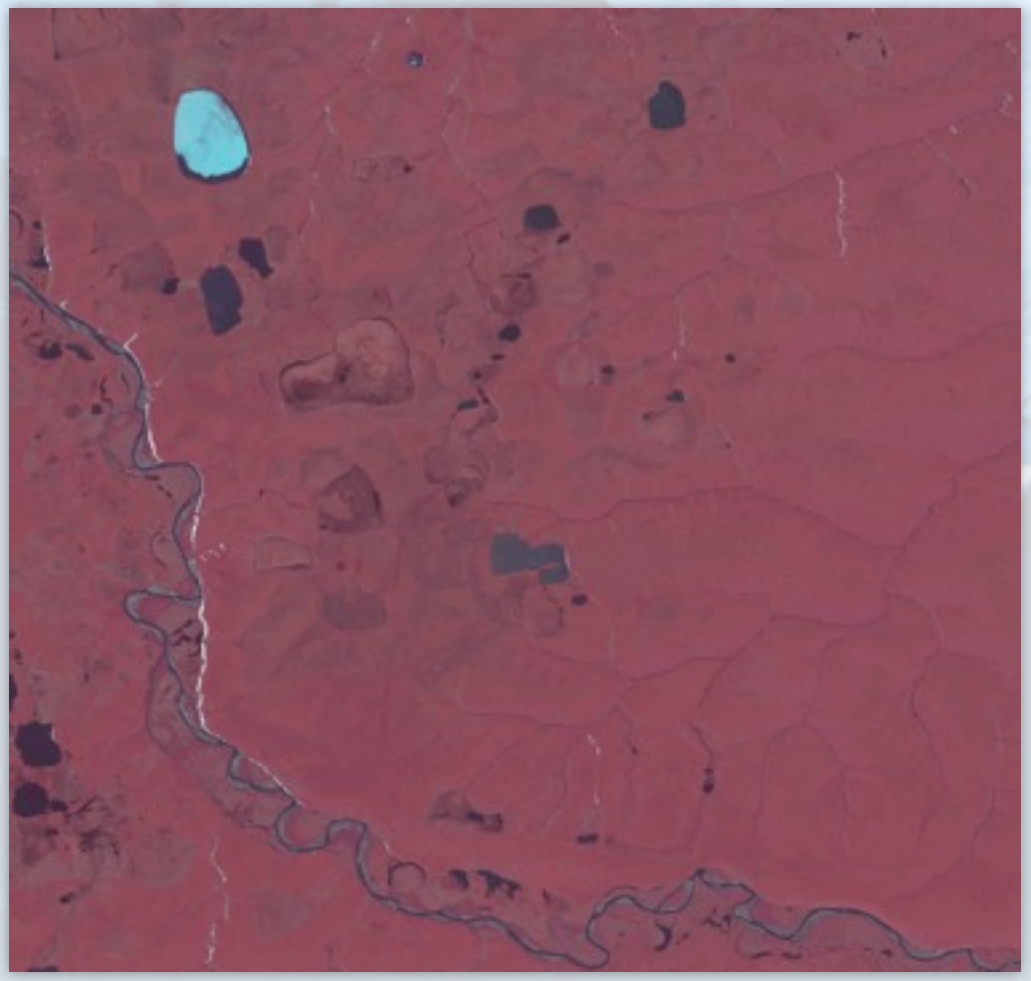
Wednesday, April 18, 12

Failed Blend

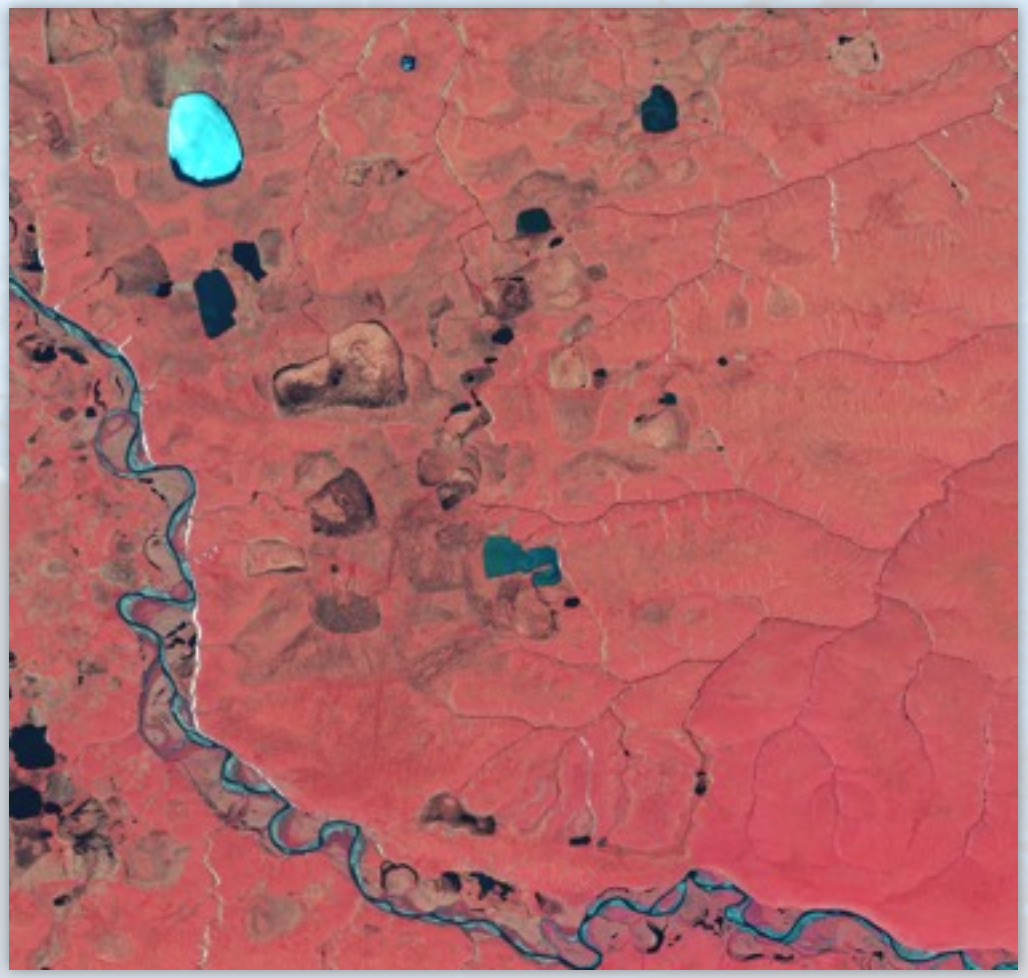
Fixed Blend


Contrast
Pass
Pass (noted issue)
Redo (recommended)
Fail (fix required)

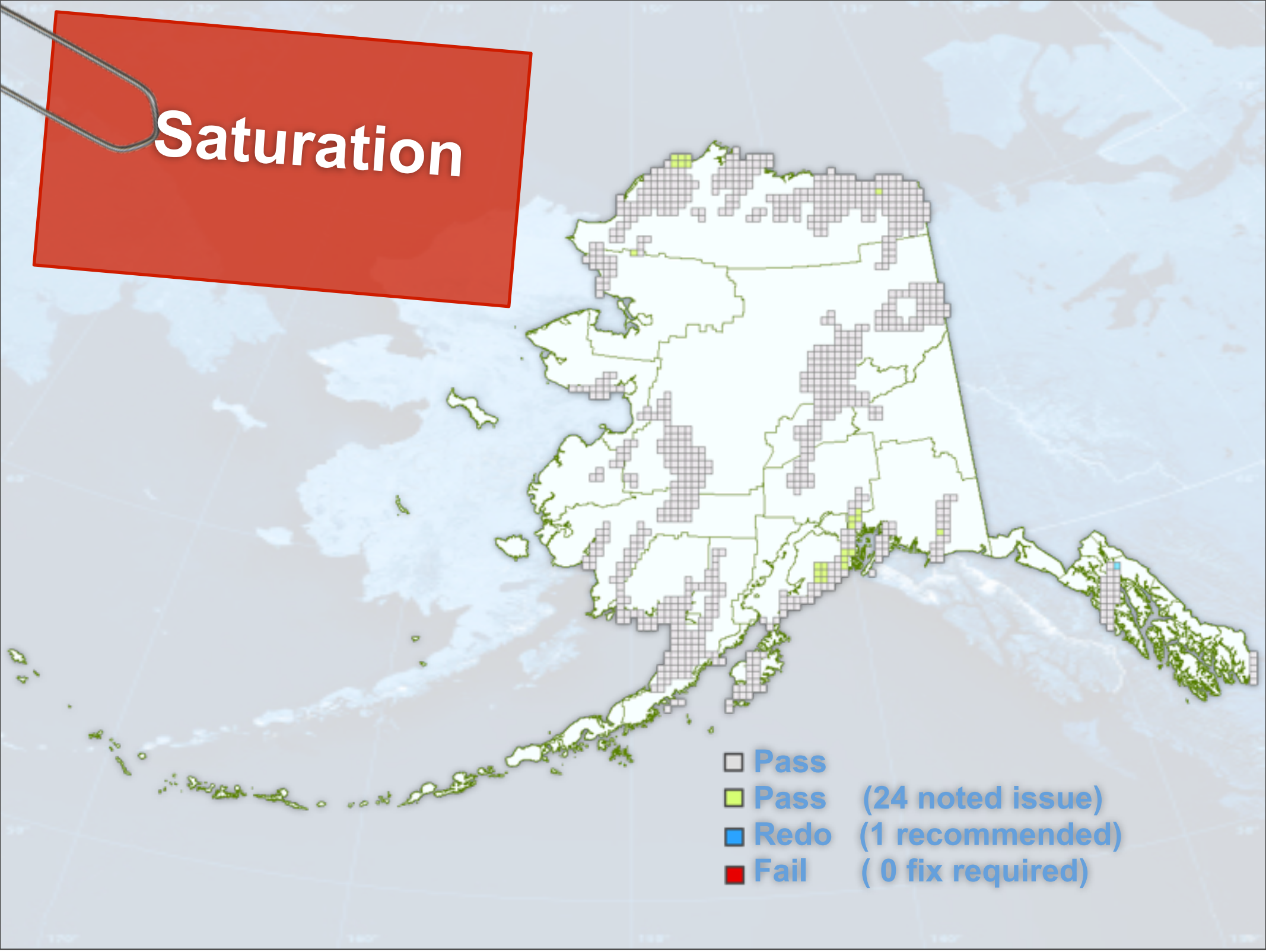
Failed Contrast

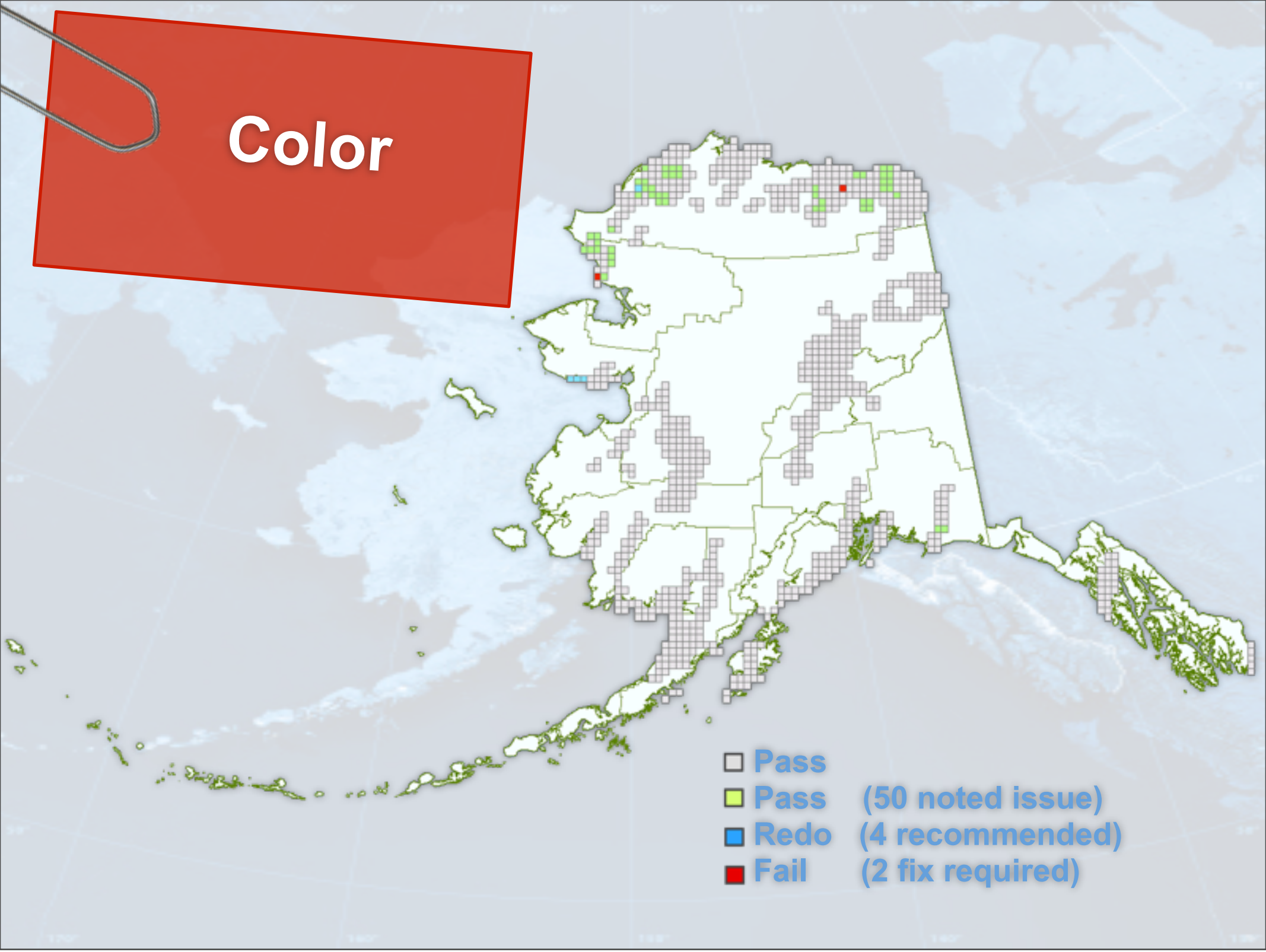


Fixed Contrast



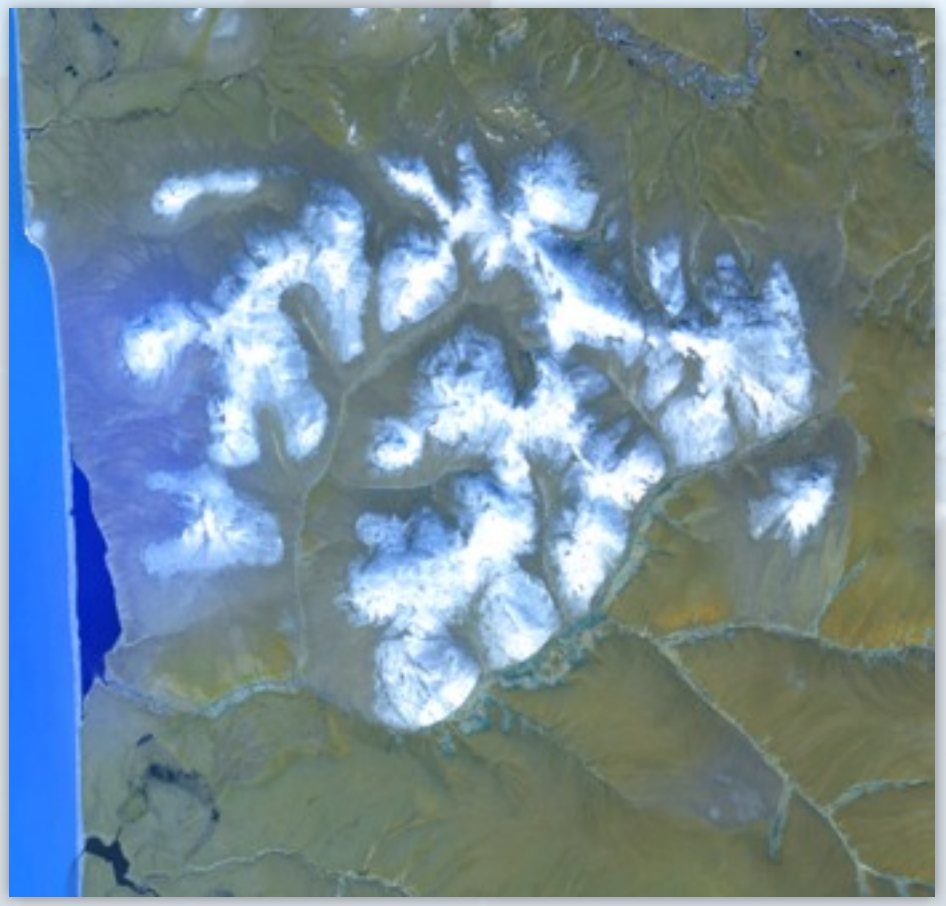
Saturation


Pass
Pass (24 noted issue)
Redo (1 recommended)
Fail (0 fix required)

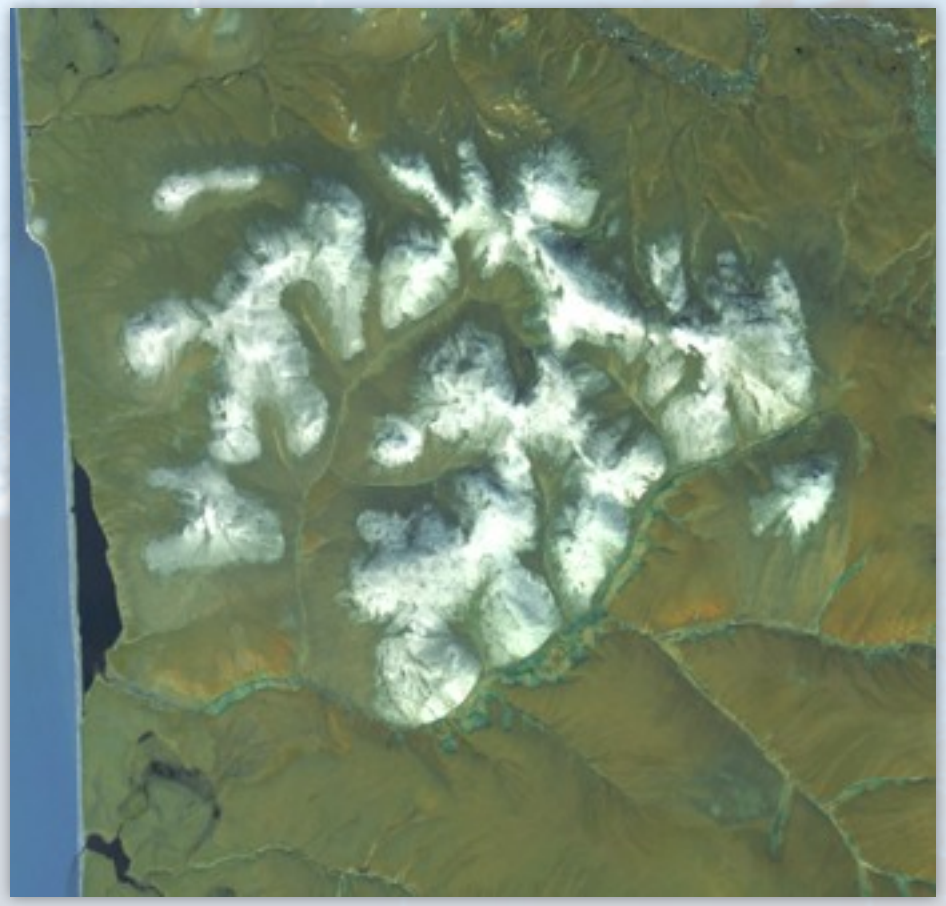


Wednesday, April 18, 12

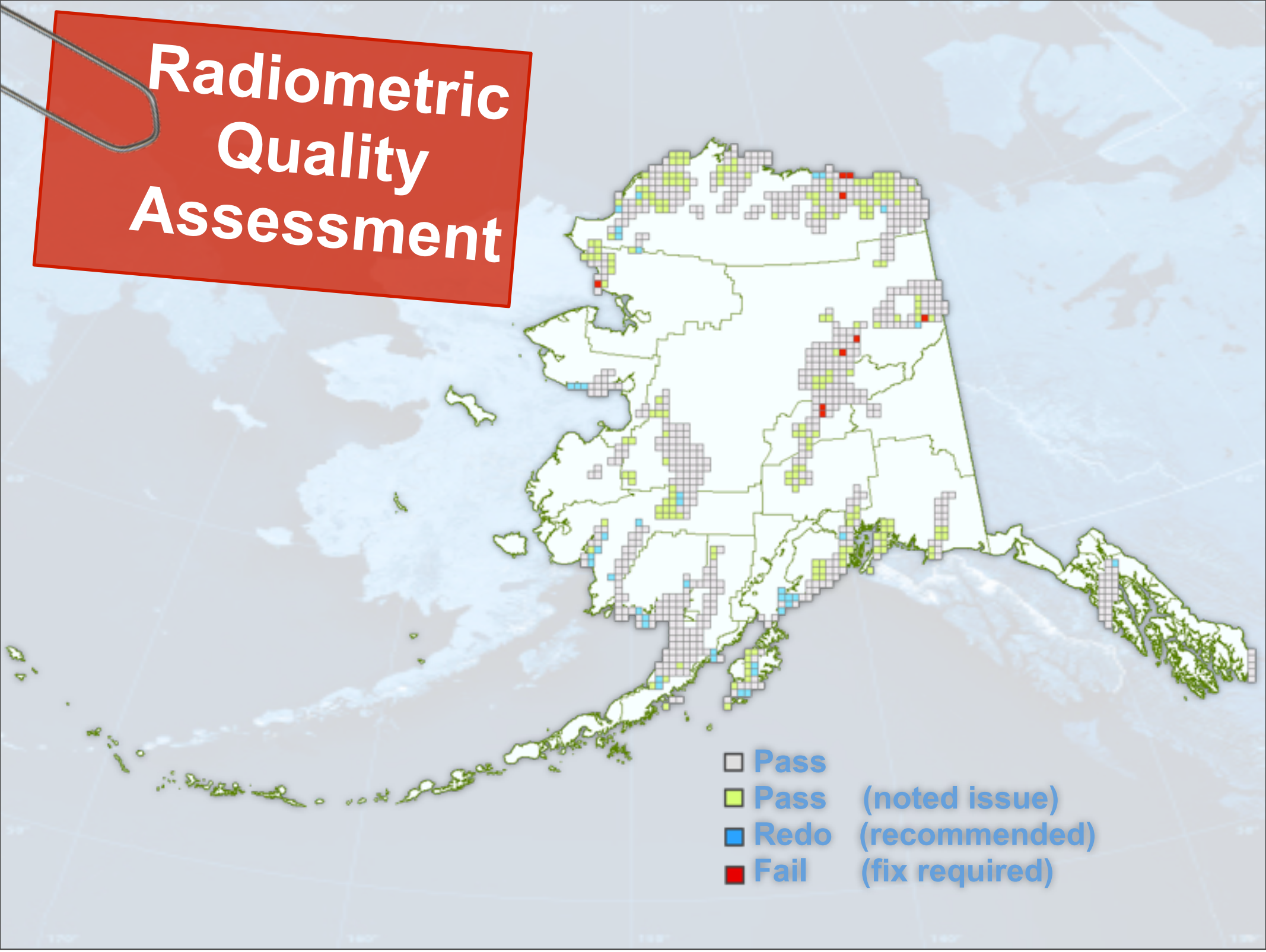
Failed Color



Fixed Color

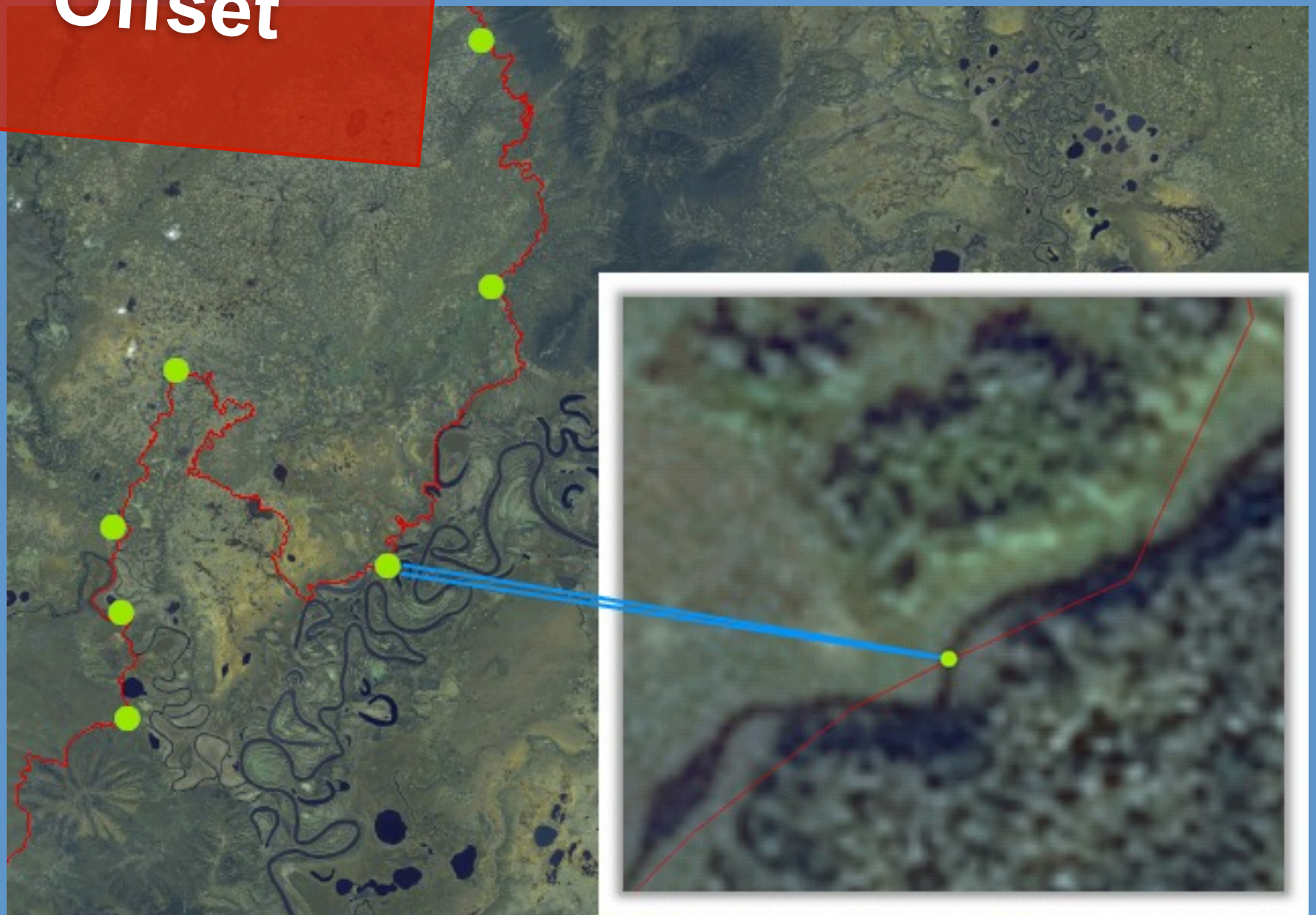


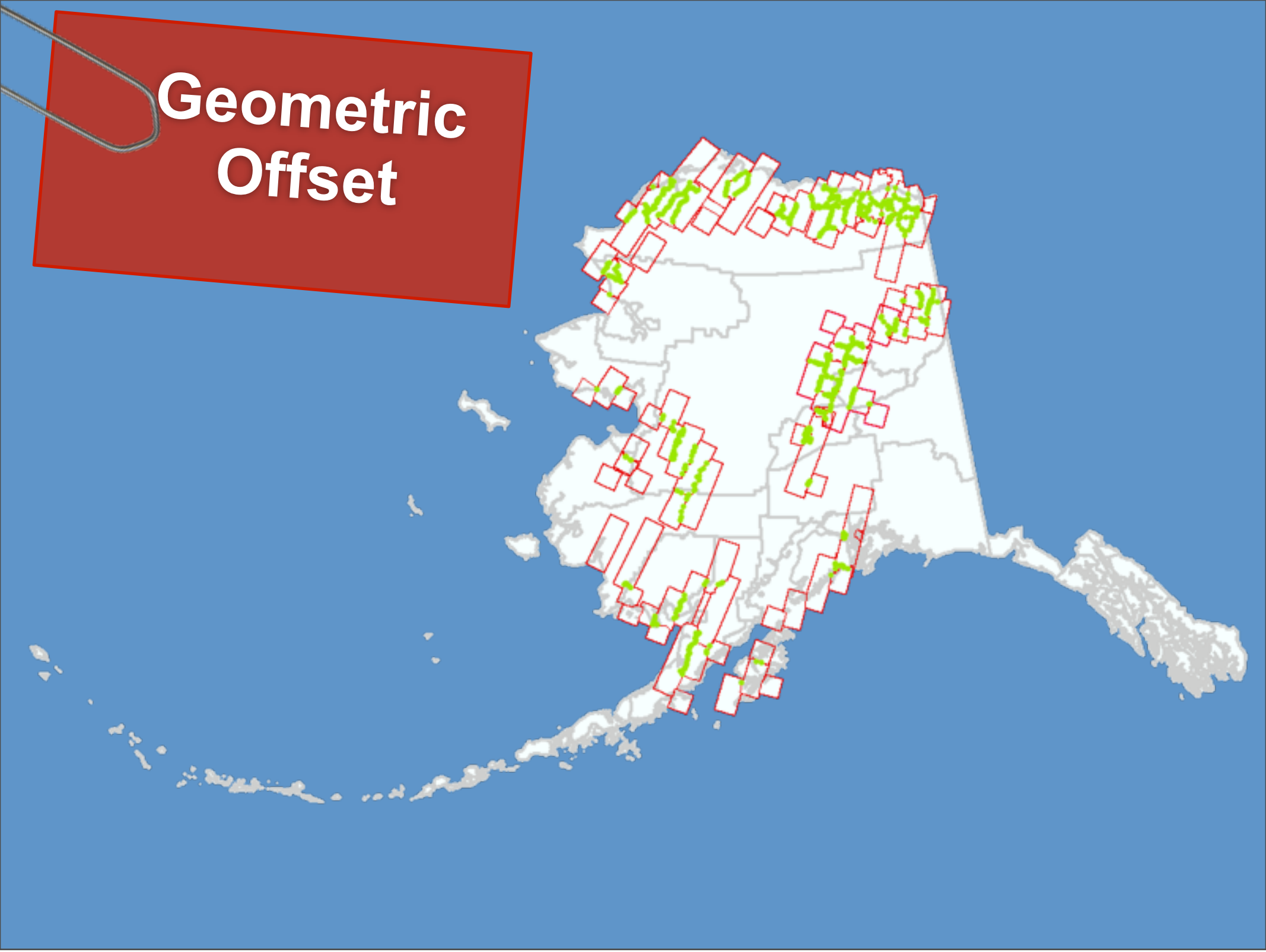
Radiometric Quality Assessment



- Geometric Offset

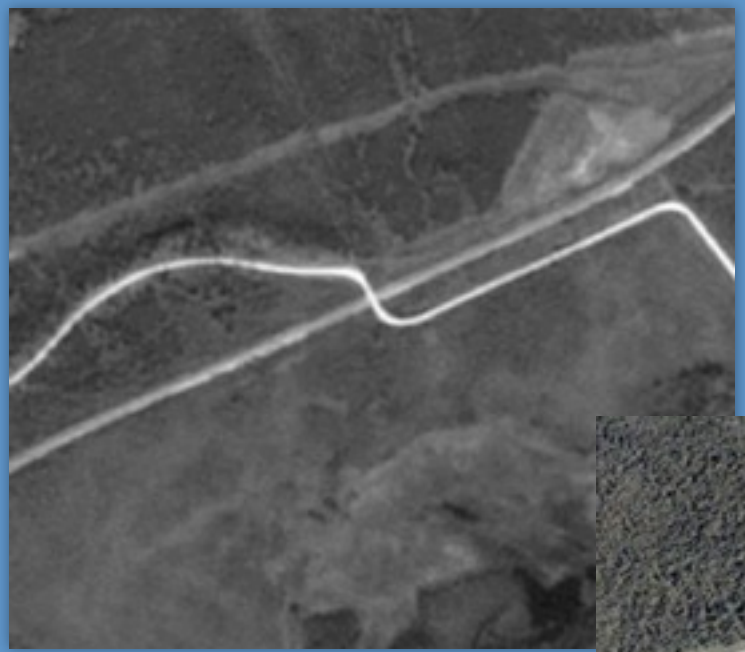
Geometric Offset




Geometric
Offset

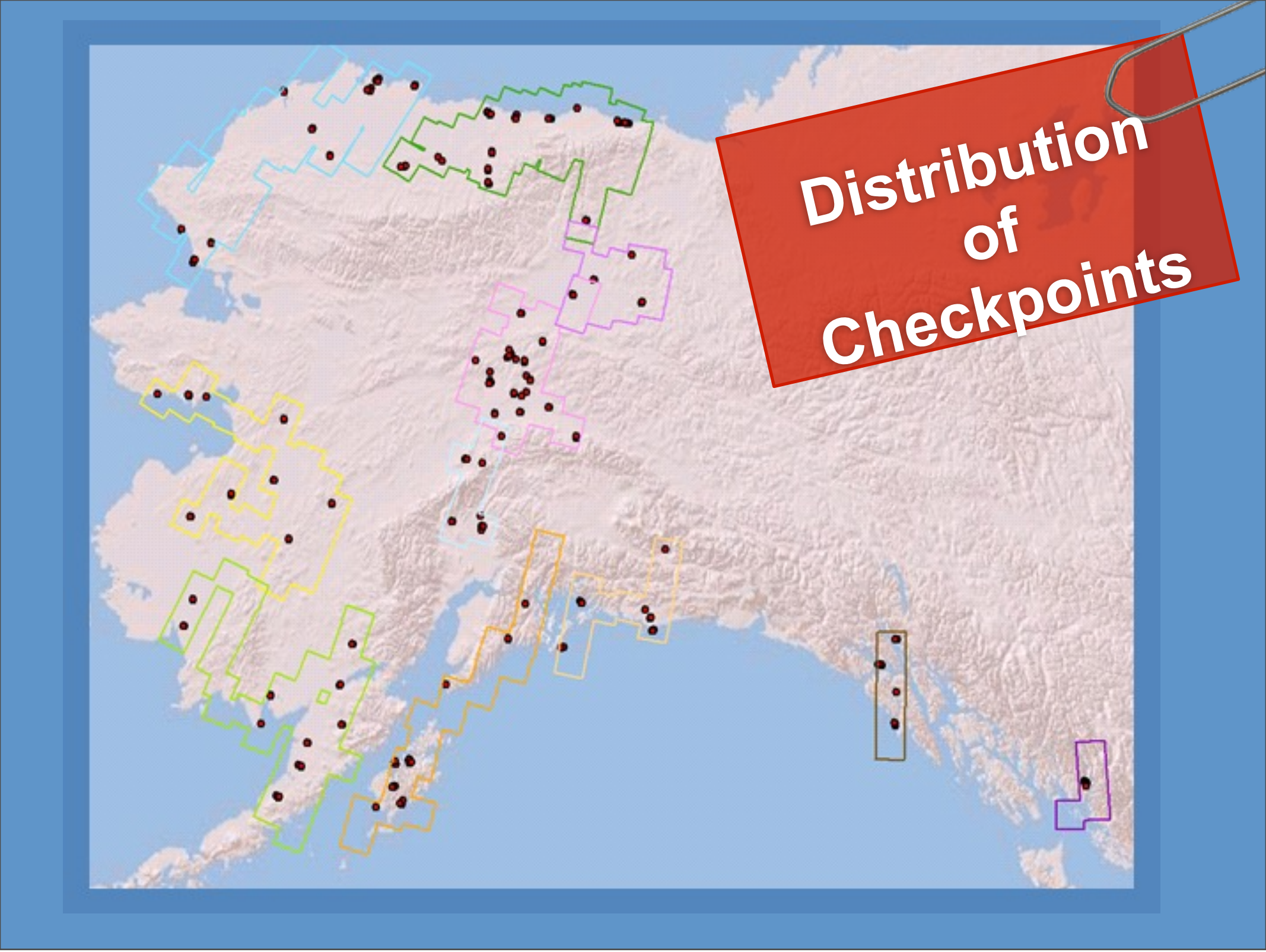
- Geometric Accuracy

Geometric Accuracy

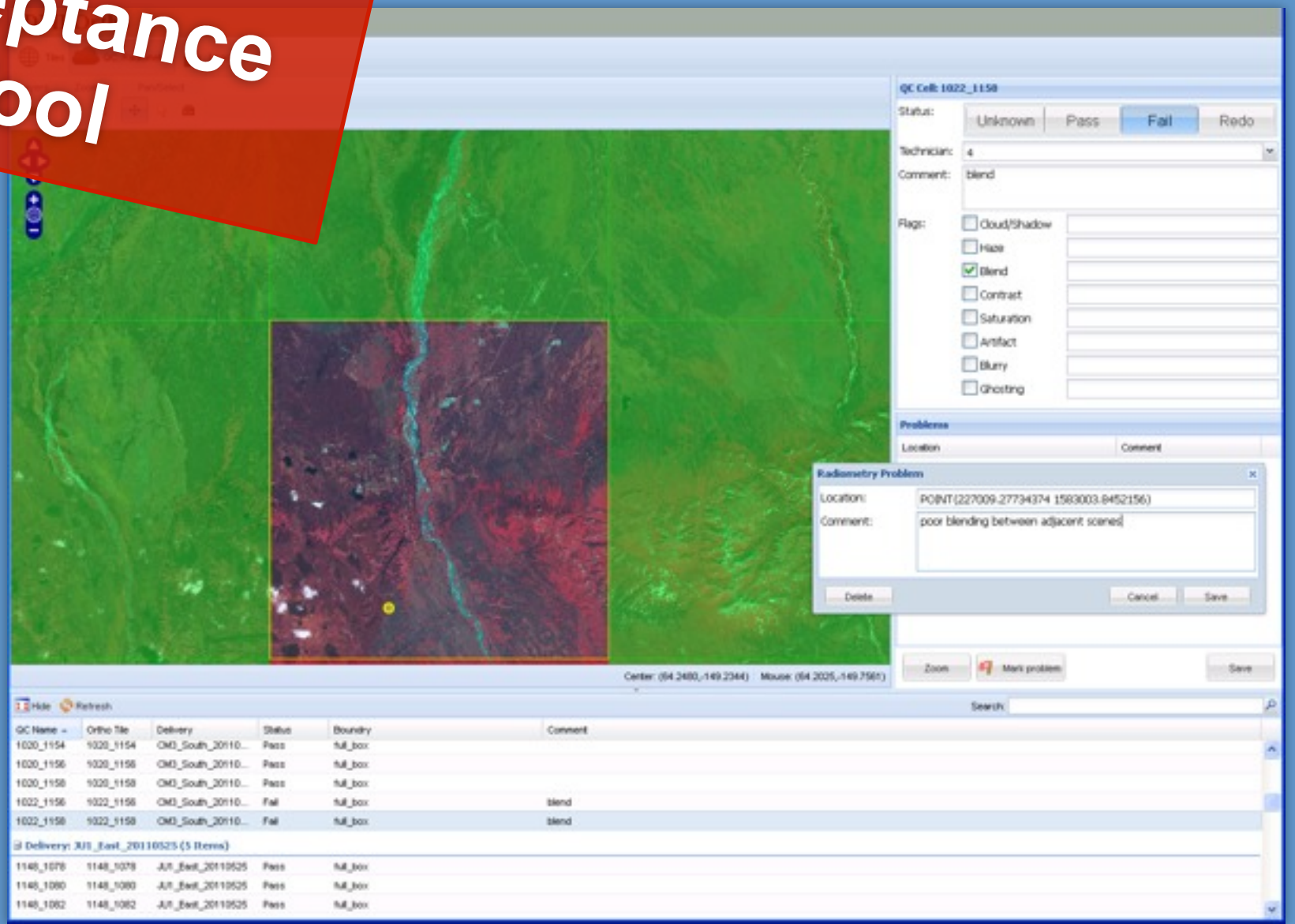


Geometric Accuracy

BlockID	No. Points	RMS in X (m)	RMS in Y (m)	RMS (m)	CE90 (m)
CM1	23	4.01474	3.18580	5.12518	**7.78**
CM3_Pilot	39	1.92024	1.44665	2.40419	**3.65**
CM3_South	16	2.25656	2.41112	3.30236	**5.01**
JU1_East	9	2.22469	3.71440	4.32957	**6.56**
JU1_West	12	2.67875	4.07422	4.87595	**4.06**
NM1	23	3.60820	2.50492	4.39246	**7.40**
NM2	45	1.64688	2.30841	2.83567	**4.30**
NM2_East	9	1.63304	2.64374	3.10745	**4.71**
SM1	27	2.38353	2.27322	3.29381	**4.99**
SM2_East	15	2.42490	2.82015	3.71933	**5.64**
SM2_West	19	2.29724	2.55574	3.88594	**5.90**


Distribution
of
Checkpoints

SDMI Acceptance Tool



2010 Summary of Findings

• **Coverage:** 341,600 sq. km of ortho mosaic was completed from imagery acquired in 2010. Approximately 18.75% of project.

• **Radiometric Quality: 94%** the ortho tiles generated from the 2010 collection scenes were compiled into the ortho mosaic and met the acceptance criteria set forth by the SDMI project .

•**Geometric Offset:** 100% of locations assessed for geometric offset were marked as having no noticeable offset.

•**Geometric Accuracy:** All blocks completed from the 2010 collection season exceeded the geometric accuracy requirement set by the SDMI.

the license

the gotcha

SDMI EULA

Best license you can get except for that ‘oops’ license that you can’t really get

Fed/Civ
US State/Local
Local government
Universities
Tribal non-profit

please read the EULA for full details

Defense users are sad

so are commercial users but we are working on a commercialization strategy

DOD/NGA could uplift the whole SDMI ortho mosaic for their users use for only $300K

Ask me how! Seriously, I've already got people in DOD asking me for a copy of the 2010 ortho tiles and it makes me sad to say no.

The data can be consumed via OGC services by all US users - integration into BDL -

SDMI EULA for others

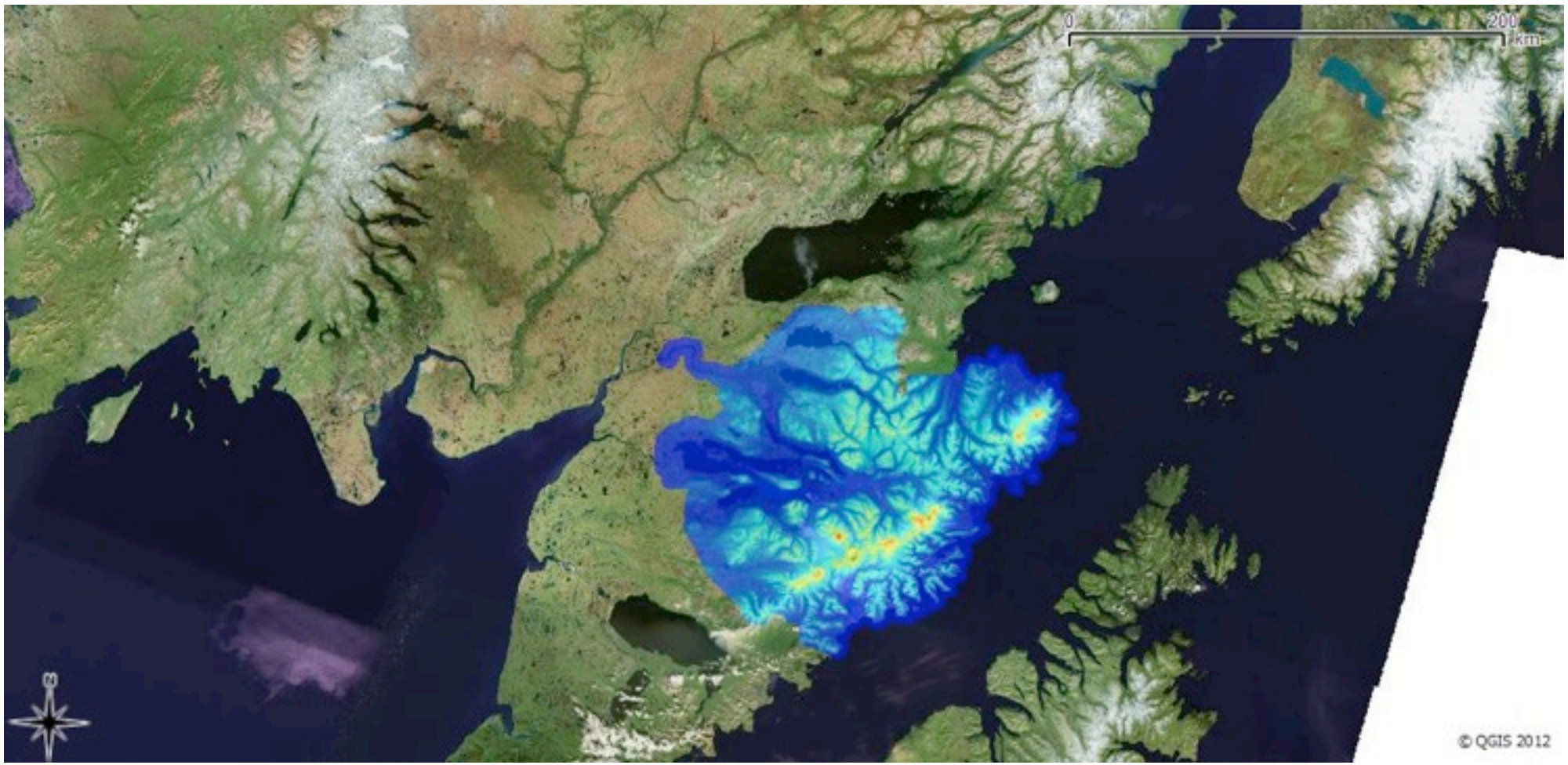
SPOT4 and SPOT5 data can be purchased with a SDMI EULA through Aerometric - find a great new SPOT5 scene in an already covered area consider this as an option.

SPOT HRS DEM pricing and SDMI EULA are an option too

Katmai National Park DEM

NPS funded - SPOT 5 HRS DEM

20-m post spacing - 5.4-m LE90 (35-ft contour interval equivalent)



GINA
www.gina.alaska.edu

SDMI ortho future

2012 collection starting

hoping for clear weather!

The Aleutians might be a problem

would a large fan work?

Refresh becoming a question

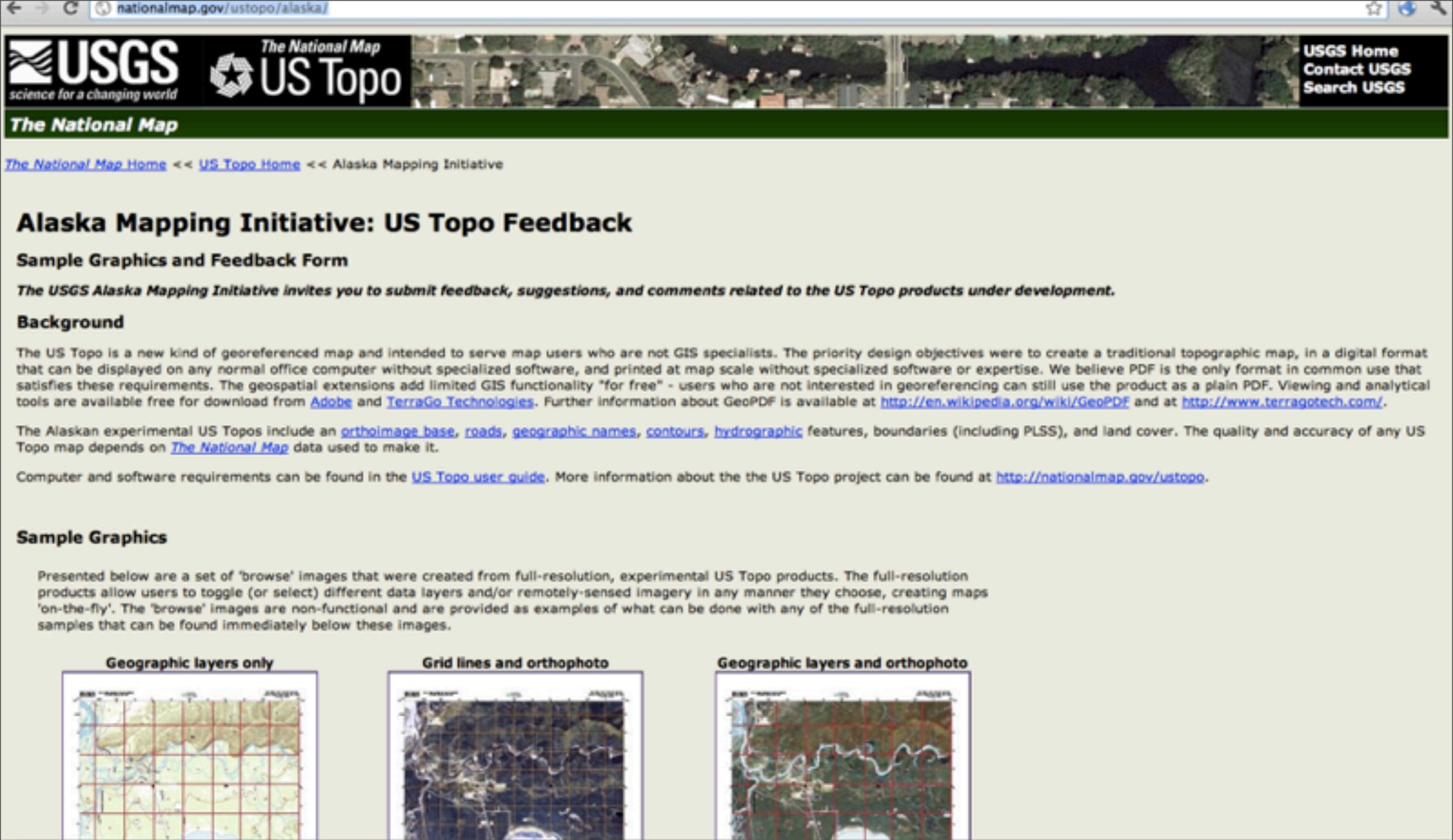
fires make alaska fun!

ALASKA MAPPED

SDMI
Statewide Digital Mapping Initiative

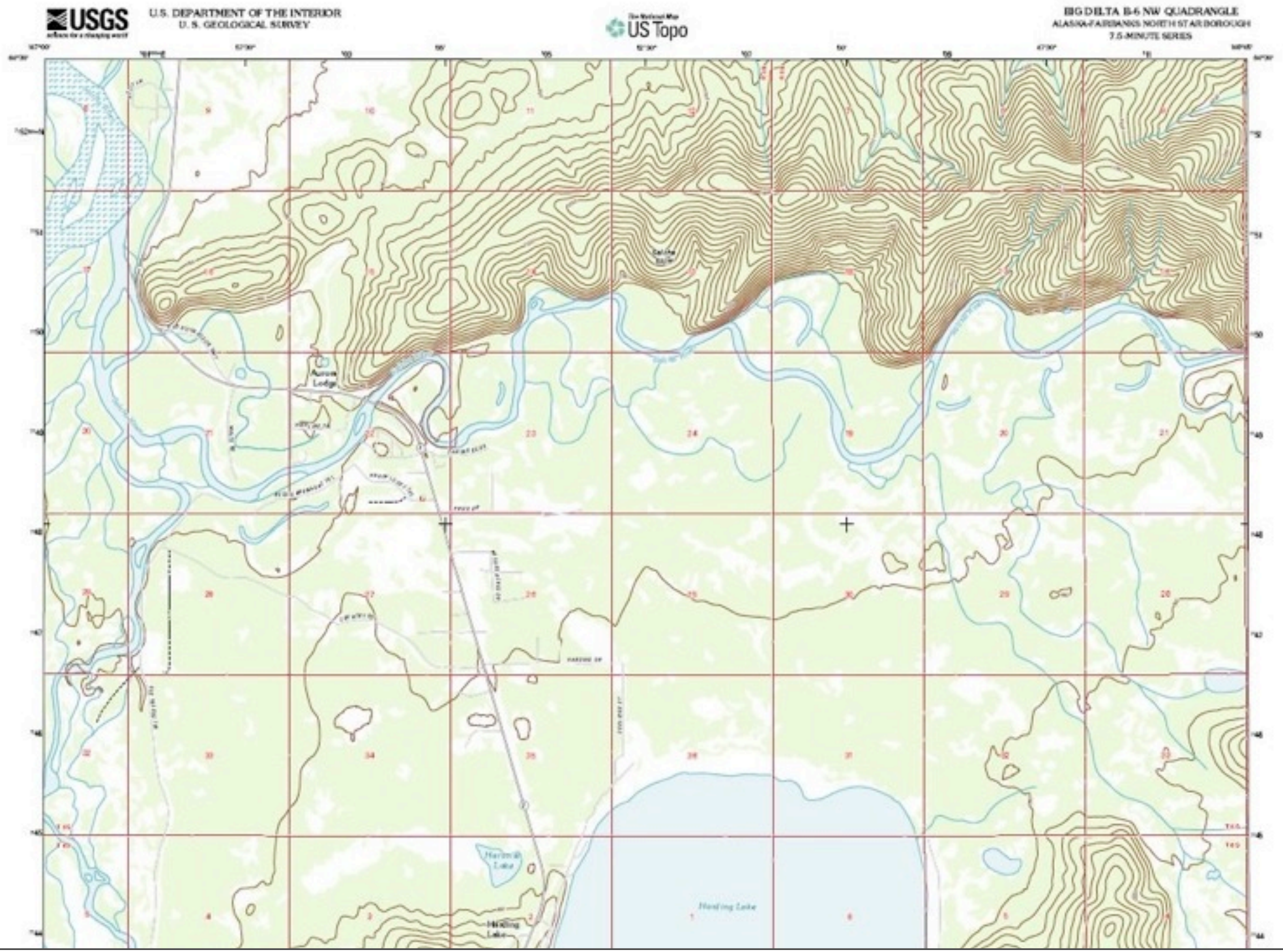
SDMI IFSAR + ORTHO

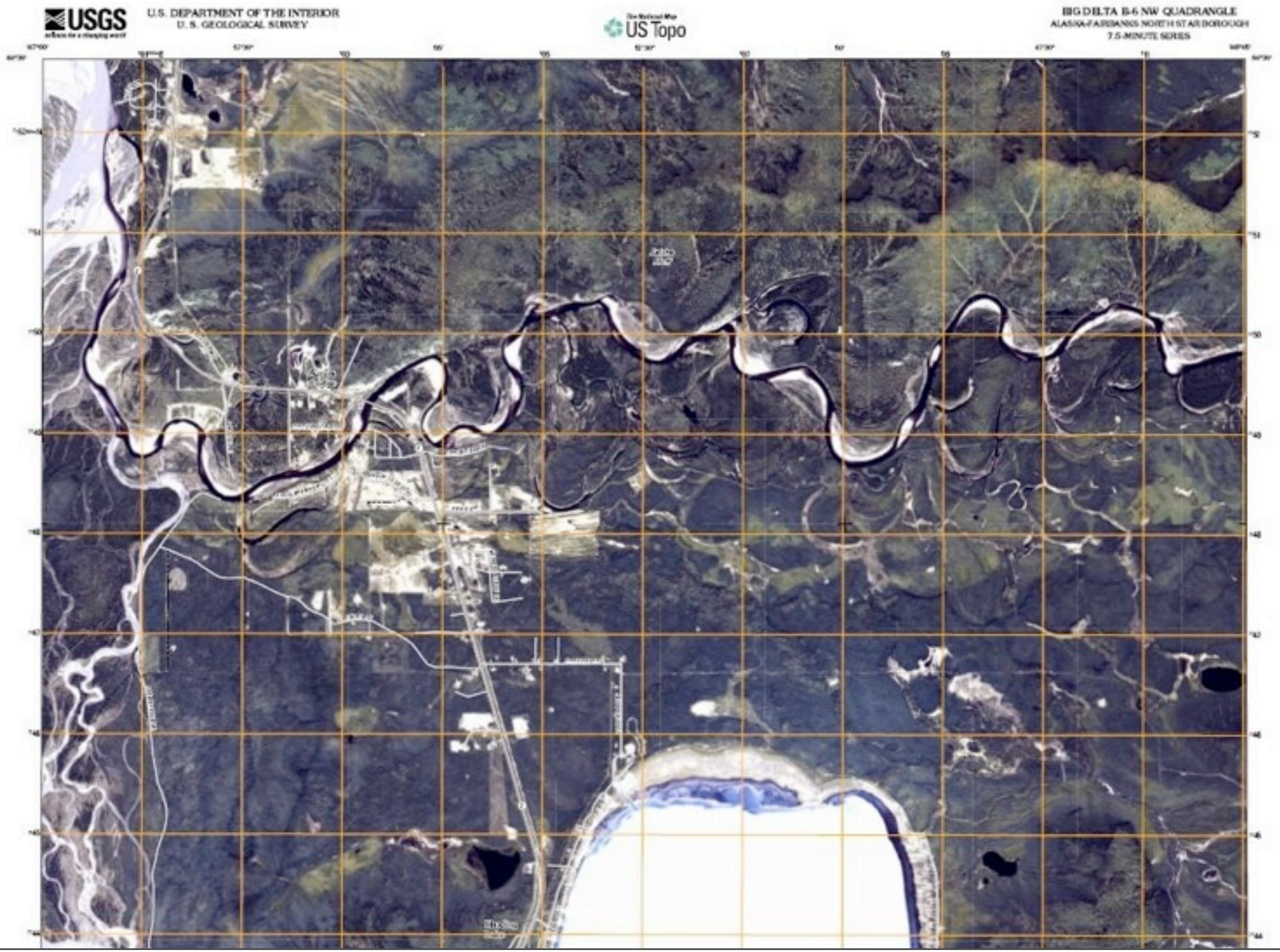
USGS topographic maps for Alaska



http://nationalmap.gov/ustopo/alaska/

They have a survey going right now for feedback on the topos. Takes less than 5 minutes


USGS
U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY
US Topo
BIG DELTA B-6 NW QUADRANGLE
ALASKA-FAIRBANKS NORTH STAR BOROUGH
7.5-MINUTE SERIES
Aurora Lodge
Harding Lake


USGS
U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY
US Topo
BIG DELTA B-6 NW QUADRANGLE
7.5-MINUTE SERIES


USGS
U.S. DEPARTMENT OF THE INTERIOR
U. S. GEOLOGICAL SURVEY
US Topo
BIG DELTA B-6 NW QUADRANGLE
7.5-MINUTE SERIES
Harding Lake

firehose off

questions?

Alaska Base Map status

Starting to make real progress

Key to success has been through funded partnerships and unfunded supporters getting on board with the program and goals

Need to keep moving forward updating, refreshing, and improving the basemaps in Alaska.